MARCH 1953

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The Paper Industry

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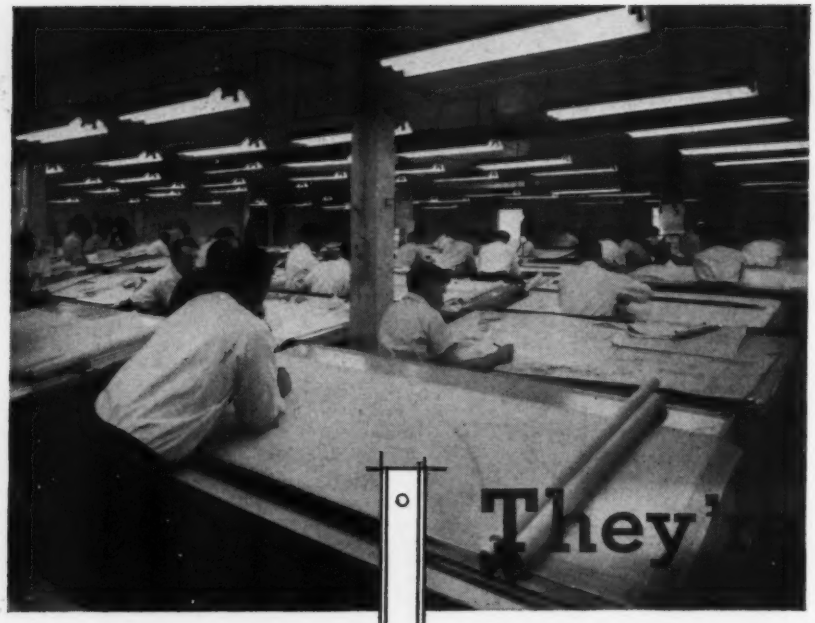

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The Jackson & Church engineering team is ready to solve *any* problem involving the use of *any* Jackson & Church equipment.

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WRITE FOR new bulletin describing the advanced "Non-Slip" Handwheel and demonstrating its outstanding features. The Lunkenheimer Company, Box 360S, Cincinnati 14, Ohio.

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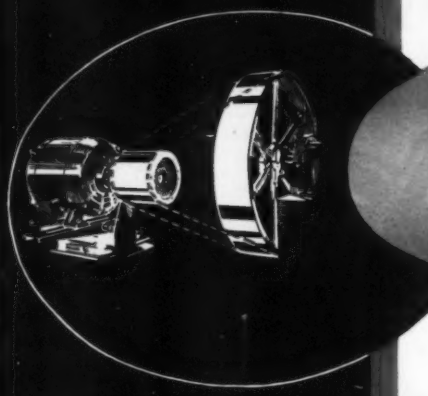

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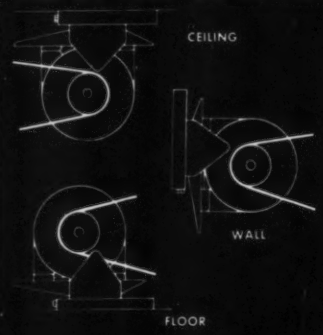
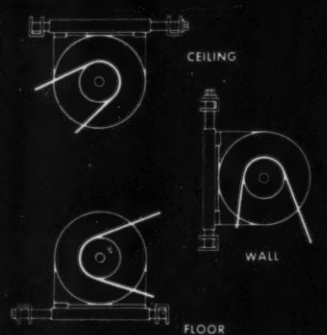


Automatic Bases



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This happens because a RESEARCH leather belt has a pulley-grip surface that reduces slippage. It withstands continuous flexing over small pulleys on short-centers. Its resiliency absorbs shock. Its minimum permanent stretch maintains correct tension.

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Just depress the valve and spray your belts while your hands and arms are always out of danger. Safe, clean, convenient. It stops belt slip, lengthens belt life. Use on leather, rubber, fabric . . . flat, round and V belts. Also sold in larger cans and drums. Ask your distributor or write us for descriptive folder.

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A manual designed especially for the man who wants to get the most from his leather belting. Write for your copy—

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B-2

The Paper Industry

Technology • Engineering • Management • Production

VOLUME 34 • NUMBER 12 • MARCH, 1953

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6 NEW HORTON DIGESTERS

for cooking pulp

The sulphate pulp digesters illustrated in the accompanying views were fabricated in one of our four shops for the St. Joe Paper Company at Port St. Joe, Florida. These digesters are 12 ft. in diam. by 45 ft. 4 in. long overall. They were designed, built, x-rayed and stress relieved in accordance with Paragraph U-68 of the ASME Code for Unfired Pressure Vessels.

Horton digesters are typical examples of the type of steel plate work we are equipped to do. We also fabricate and erect chip tanks, pulp tanks, acid tanks, accumulators, blow tanks, elevated water tanks and Marx Savealls for the pulp and paper industry. We build structures of carbon steel, carbon steel clad with non-corrosive metals or from solid non-corrosive metals. Corrosion-resistant linings can also be furnished.

Our shops are equipped for x-raying and stress-relieving and we have facilities for pickling and painting fabricated steel plate work by the Horton Phosphoric Acid Process.

Estimates or quotations on any Horton structure may be had by writing our nearest office. There is no obligation on your part.

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Effect of 2% Addition (Bleached Sulfite Stock)

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HYDROSEAL improves formation and scuff resistance of the sheet, and improves greaseproofness of glassine. It cuts white water losses by increasing retention of fillers and fines, lays fuzz, and gives a better surface.

HYDROSEAL gives you better retention of starch in the sheet, too. And it's versatile — works in all types of paper from high grade bond and book papers to Kraft. For example, it improves the Mullen and formation of ledger paper and increases the flat crush of corrugating medium.

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BOWSER LUBRICATION SYSTEMS plus ROSS EXCHANGERS

Bearings, gear-teeth, hydraulic pumps and other close-clearance parts won't become oil-thirsty in *this* paper mill. A Bowser Centralized Lubrication System provides a constant flow of lubricating oil to machines throughout the mill.

And because it's so vitally important that the "system" not only provides an ample supply of the lubricant, but has ample capacity for *cooling* it, this Bowser Unit is Ross-Exchanger-equipped. Conditions involving high speeds, high pressures, and high temperatures *demand* it! Ross Exchangers, like Bowser Lubrication Systems, have long had a reputation for utmost dependability.

The use of Ross Exchangers on lubrication units such as Bowser's is merely one example of their widespread application in the paper and pulp industry. Calenders, pulp grinders, paper machine dryers, turbine drives, Diesels, compressors — *of numerous makes* — are regularly Ross-equipped. Machinery manufacturers everywhere have come to recognize the truly practical advantages of furnishing Ross units to safeguard lube oil and hydraulic fluid temperature. Complete standardization is one of the reasons. A wide range of available sizes and designs is another. But, their downright ruggedness — *the ability to take it* — is most important of all!

For preliminary details, request Bulletin 2.1K1. For the direct answer to *your* problems, consult with your nearest Ross Exchanger representative.

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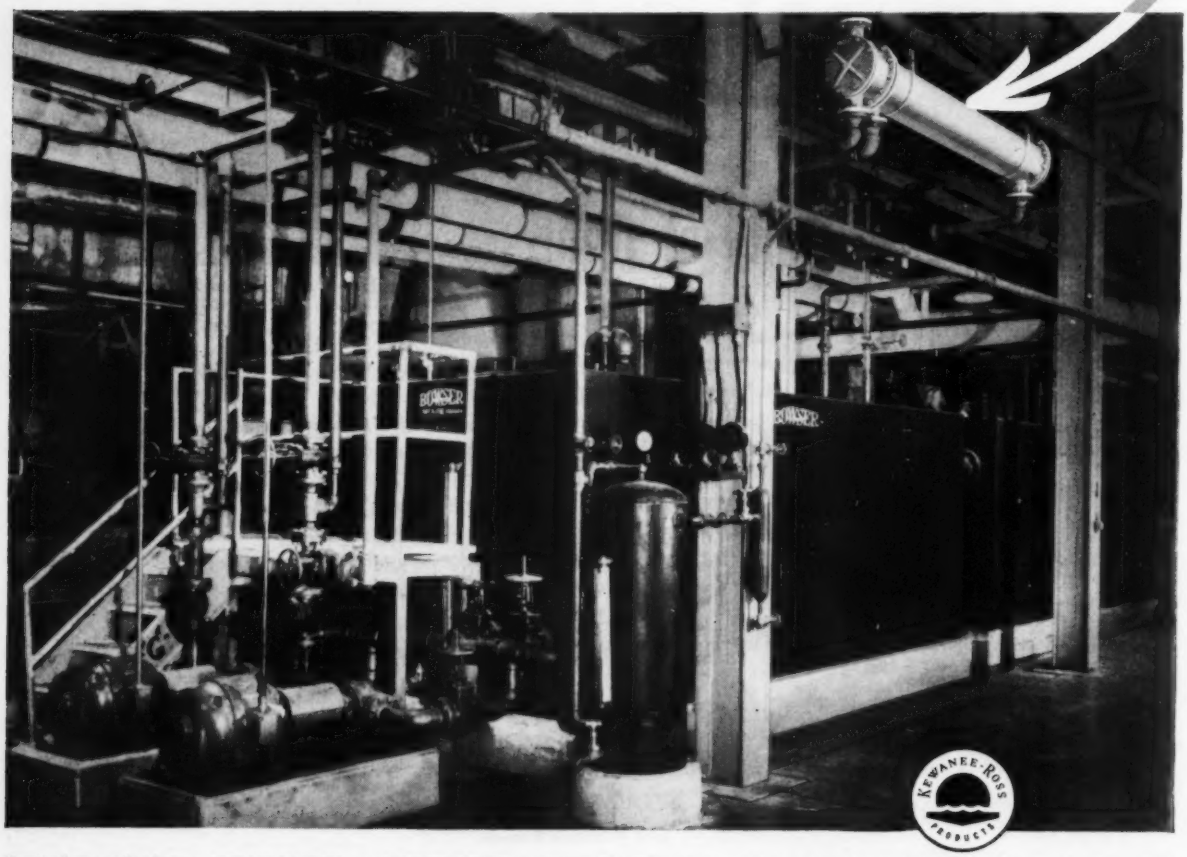
EXCHANGERS



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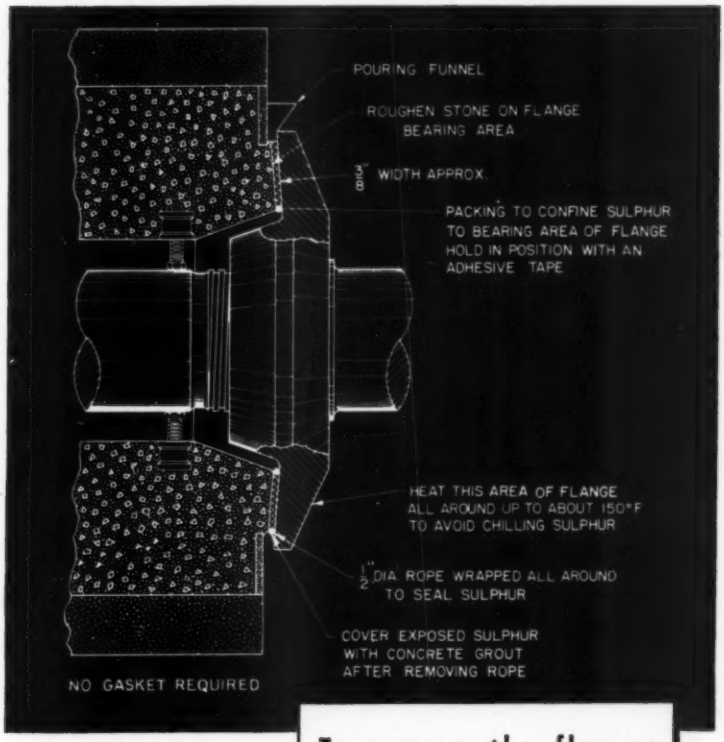
A Suggested Method of Mounting Pulpstones


POURING FUNNEL
ROUGHEN STONE ON FLANGE BEARING AREA
1/16" WIDTH APPROX.
PACKING TO CONFINE SULPHUR TO BEARING AREA OF FLANGE HOLD IN POSITION WITH AN ADHESIVE TAPE
HEAT THIS AREA OF FLANGE ALL AROUND UP TO ABOUT 150°F TO AVOID CHILLING SULPHUR
1/2" DIA. ROPE WRAPPED ALL AROUND TO SEAL SULPHUR
COVER EXPOSED SULPHUR WITH CONCRETE GROUT AFTER REMOVING ROPE
NO GASKET REQUIRED

Easy to Mount

and even more important

Easy to Remove

THE method of mounting a pulpstone shown in the drawing has been used in European mills for several years and has recently been adopted by a number of American mills. It has proved so successful wherever it has been tried that we are illustrating it here so that you may use it if it appeals to you.

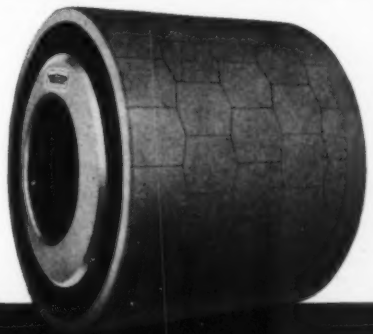
While a bevel flange is illustrated this method can be used with any type of flange

Norton Pulpstone Engineering Service can be of help to you in many ways, including the specifying of the right stone to produce just the type of pulp which you require.

NORTON COMPANY, WORCESTER 6, MASS.
Norton Company of Canada, Ltd., Hamilton, Ontario

To remove the flanges the following method is suggested:

1. **Remove the cement grouting covering the sulphur**
2. **Heat the flange in the sulphured area until the sulphur melts**
3. **Then unscrew flange**



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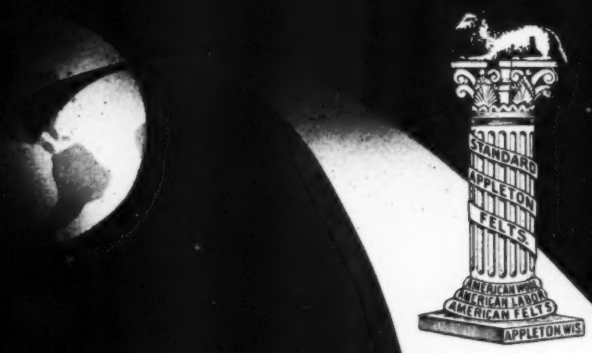

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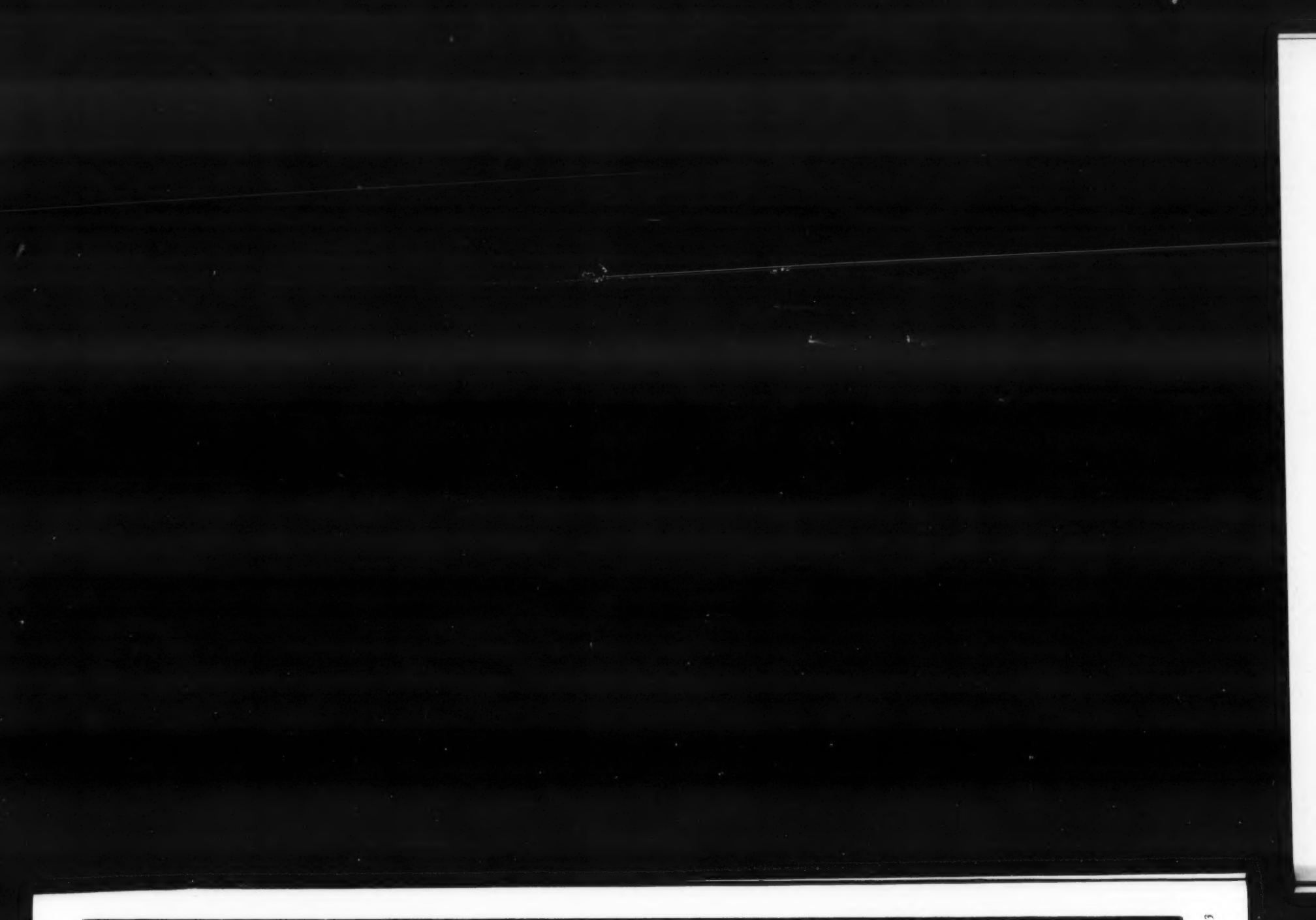

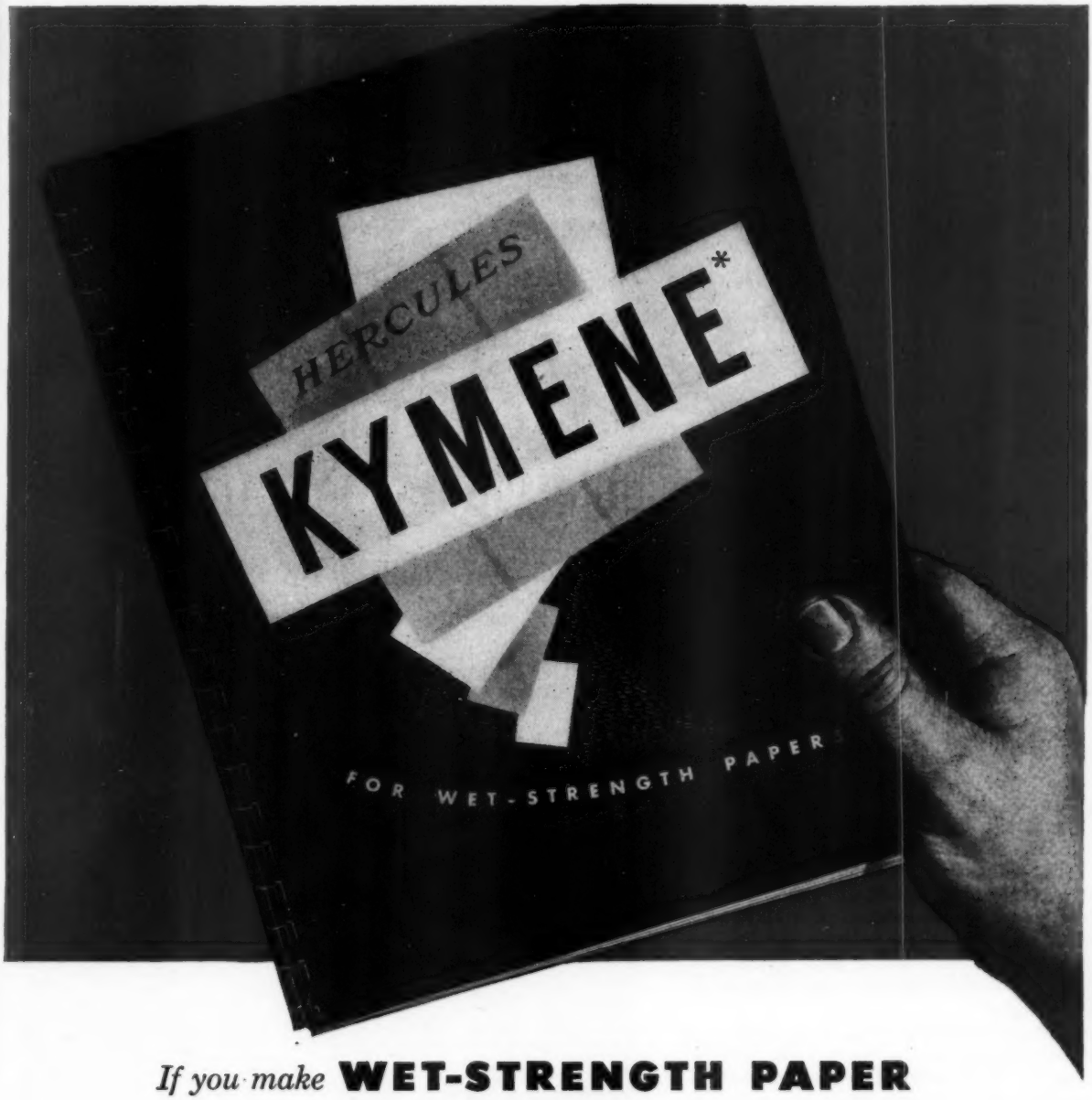

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*HERCULES TRADEMARK

PP53-2

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- designed to fit your needs

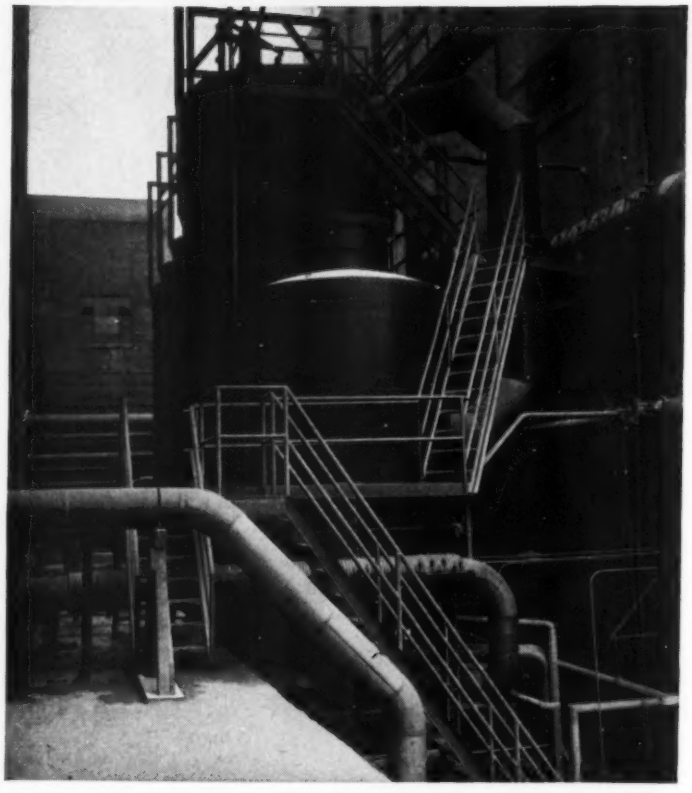
Conkey Long Tube Film Type Evaporator

Conkey Long Tube Type Evaporators for the concentration of sulphate, soda and semi-chemical black liquors meet the economy and continuous automatic operation requirements of modern pulp mills.

Each Conkey Integral Type Evaporator Body is a unit construction comprising heating element, vapor body, and centrifugal type entrainment separator in a single self-supporting body. This integral body is completely assembled in our shops and shipped to the field as a unit, where it is set in place in one up-ending operation, thus reducing field assembly and erection to a bare minimum. Fewer joints for vacuum leakage, less maintenance and smaller floor space, and housing where required, are designed-in advantages.

Reduced pressure drop losses between effects provide an increased working temperature drop across the heating element resulting in a net positive gain in evaporation. Effective condensate removal and an exclusive design for positive non-condensible gas removal insure high rates of heat transfer.

The integral design lends itself to fusion welded construction in carbon steel and also in stainless steels to meet special corrosion problems. Design also permits of construction to ASME and API-ASME codes for high pressure operation.



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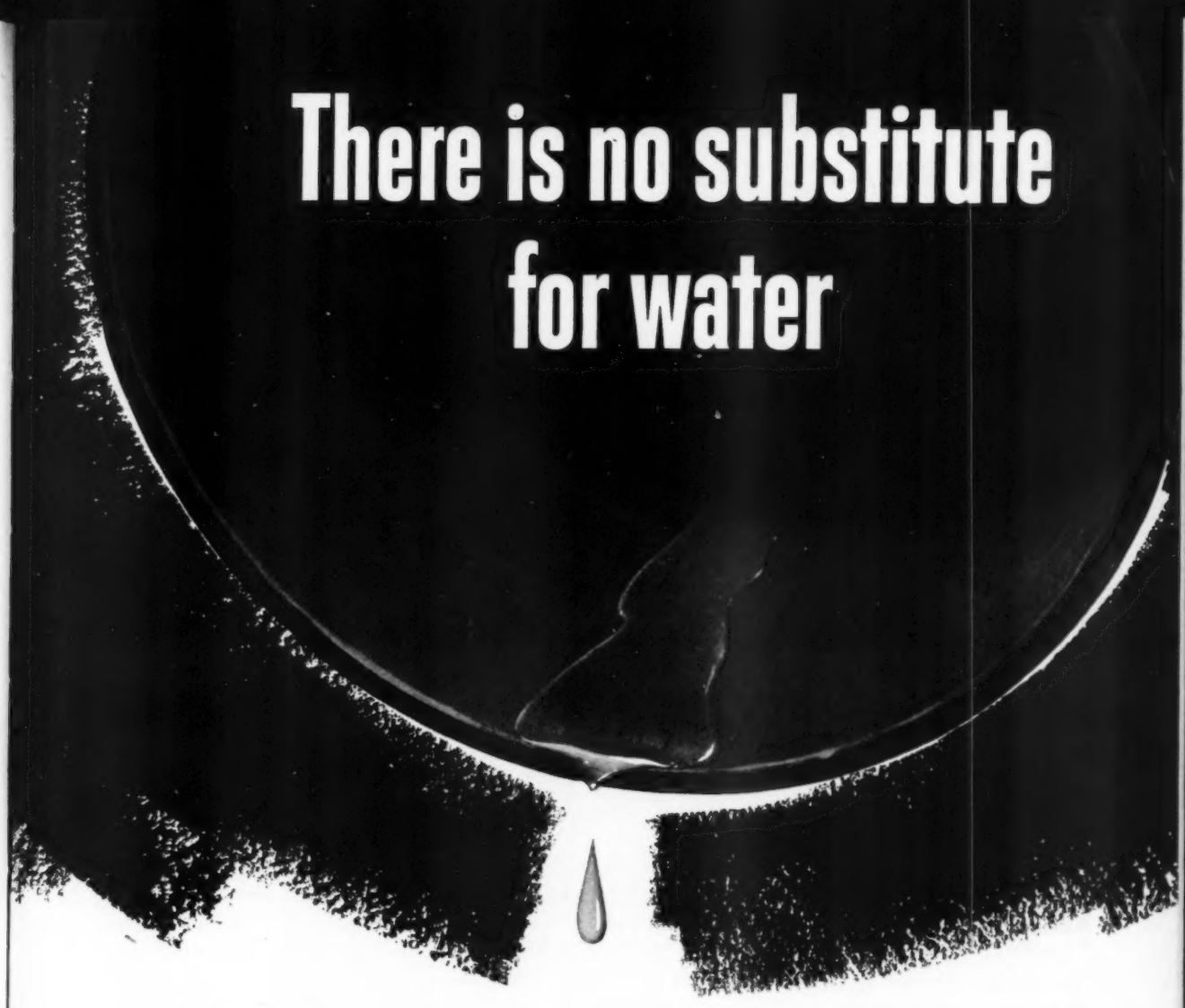
There is no substitute for water



. . . and there is no substitute for experienced engineering in developing a dependable water system

Nothing has ever taken the place of water among the basic needs of man. And nothing will ever take the place of safe, sure, *experienced* engineering in developing a dependable water supply.

Layne's reputation as the world's most experienced developer of well water systems was earned by engineering skill every step of the way—from on-the-spot geological surveys to the precision designing of each pump for its particular job. For the best in well water systems, there is no substitute for Layne engineering.

Let Layne engineers help you PLAN AHEAD on your water needs

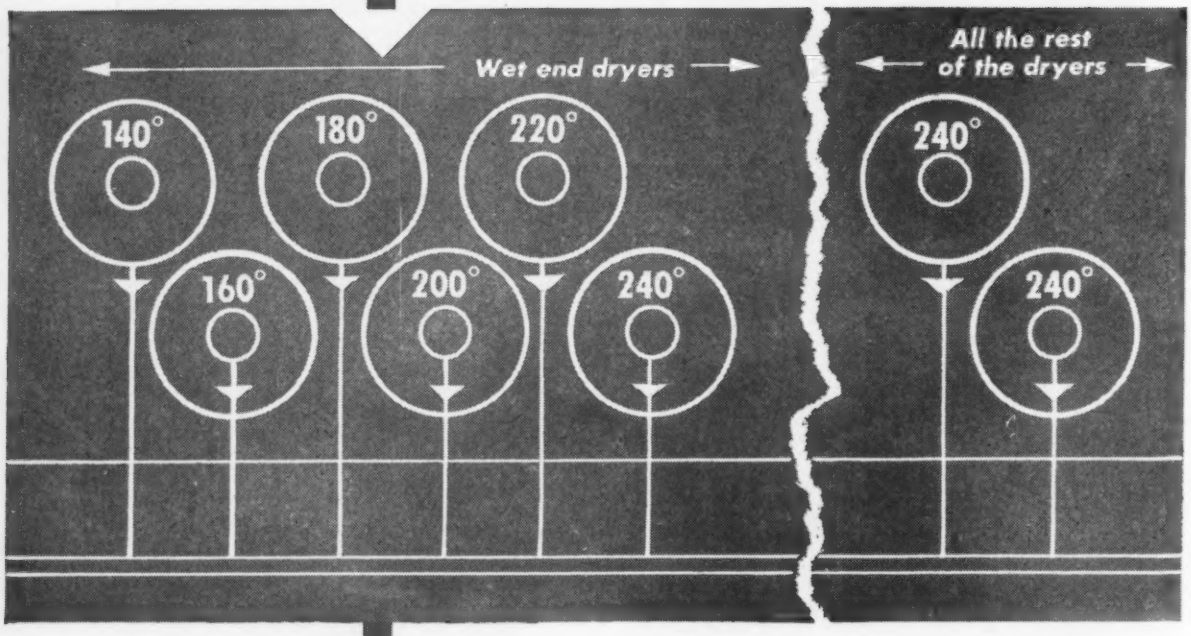
Layne welcomes the opportunity to share in long-range planning for water-system needs. Contact your nearest Layne Associate Company or write Layne & Bowler, Inc., General Offices, Memphis 8, Tenn.

WATER WELLS

VERTICAL TURBINE PUMPS

Layne Associate Companies Throughout the World

HOW THE ARMSTRONG INDIVIDUAL DRYER TEMPERATURE CONTROL GIVES YOU BETTER DRYING:



- **Keeps Wet End Dryers "Cool"**
- **Prevents Sheet from Sticking and Curling**
- **Controls each Dryer Independently**
- **Maintains any Temperature from 100° to 250°F**
- **Positive—Dependable—Guaranteed**

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This bulletin tells exactly how it works

WRITE FOR BULLETIN NO. 187 — two-color diagrams and explanation show you how the Control operates to give you accurate dryer temperature control.

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Individual Dryer Temperature Controls
Paper Machine Drainage Traps
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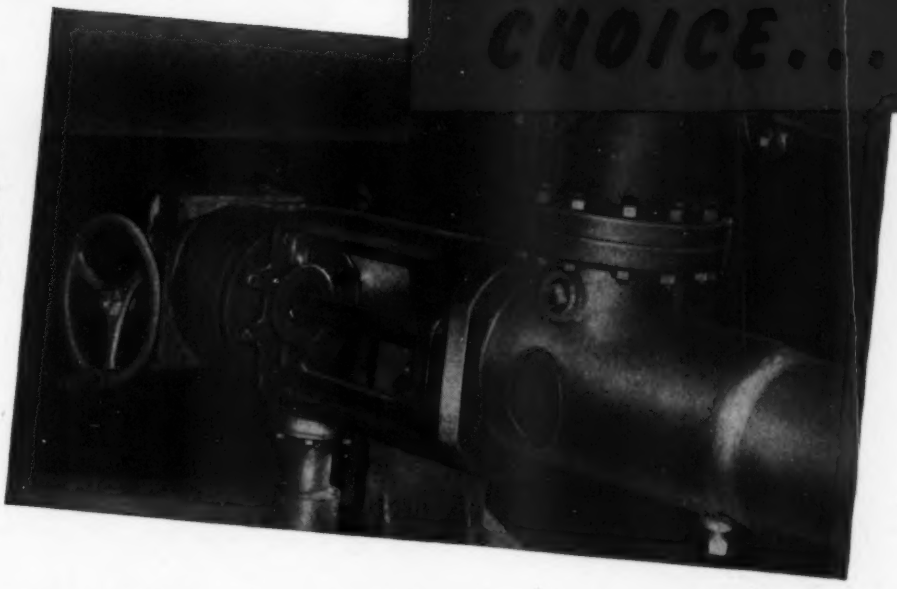
HYDRAULIC-OPERATED

Yarway Digester Blow Valve—one of six installed at large North Carolina paper mill.

TAKE YOUR CHOICE...

MOTOR-OPERATED

Yarway Digester Blow Valve—one of eight installed at large Canadian paper mill.



You can choose between hydraulic-operation and motor-operation when you specify Yarway Digester Blow Valves. Both combine all the following Yarway advantages:

- Remote control, usually from above, on the operating floor.
- Tight shut-off. Effective sealing under full digester pressure. Saves cooking liquor. Insures thorough pulp cooking.
- Free discharge. No pockets. Full discharge with minimum pressure drop. Digester blows clean.
- Rugged construction. Built to withstand shock and wear of toughest service.
- Modern metallurgy—such as sliding plunger of hardened stainless steel and sleeve of chromium nickel—resists wear and chemical action.

For full details, write for Yarway Bulletin B-440.

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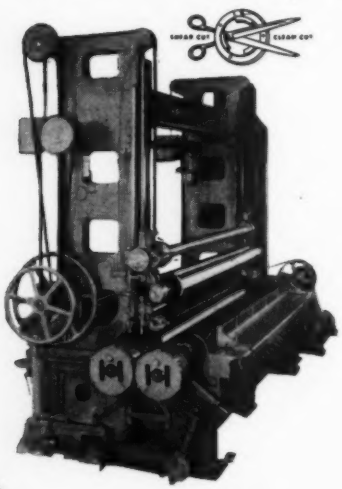
YARWAY

DIGESTER BLOW VALVES

LANGSTON
Slitters and Winders



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SAMUEL M. LANGSTON CO.
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When Surface is Sized With

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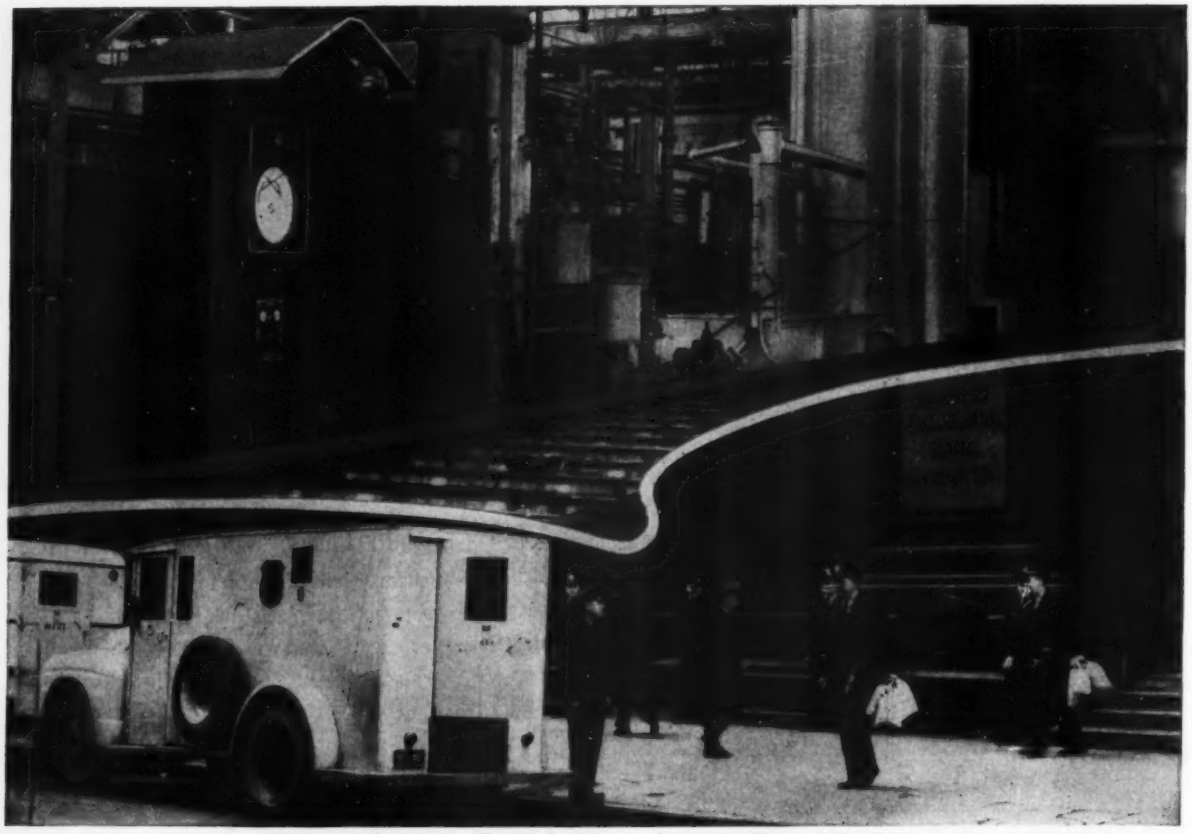
Picture of
"VANCEOMETER" Absorbency Tester
courtesy of Hillside Laboratory,
Hillside, Illinois



Modern Safeguards—Brink's for Money, Bailey for Process Materials

Are Your Process Materials Guarded As Well?

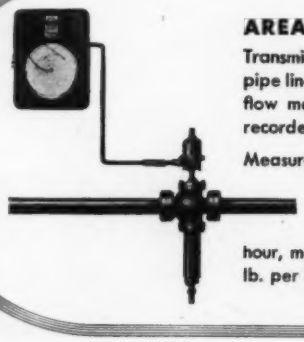
HERE'S HOW TO PREVENT SPOILAGE AND WASTE . . .

TO avoid waste of valuable process materials and finished products, process rates and conditions must be accurately measured and controlled. That's where Bailey Meters, Analyzers and Controllers can help you to improve the efficiency of your plant.

Take flow for instance. Bailey Meter Company offers a complete line of flow measuring and controlling equipment for applications ranging all the way from high pressure steam to low pressure gas. We measure flow in pipes, open channels, ducts, furnaces, smelters, kilns, ovens, dryers.

When you call Bailey Meter Company, you get the help of years of experience as well as recommendations from a wide selection of measuring and controlling devices.

Your local Bailey Engineer is as near as your telephone. He has the experience and the equipment necessary to set up an effective guard for your process materials. P-26



AREA TYPE FLOW METER

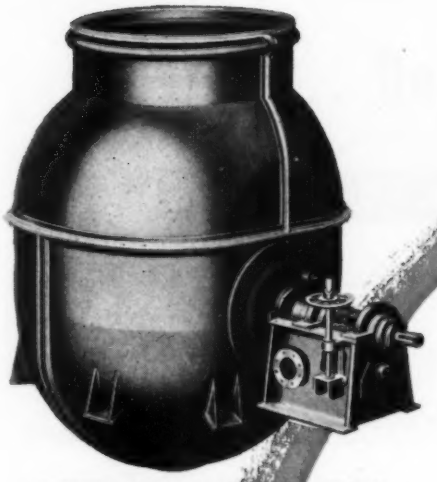
Transmitter goes into 1, 2 or 4 inch pipe line like a valve and transmits flow measurements electrically to recorder in remote location.

Measures oil and other clear liquids under static pressures up to 600 psi. Minimum range 0 to 1200 lb. per hour, maximum range 0 to 9600 lb. per hour.

BAILEY METER COMPANY

1058 IVANHOE ROAD
CLEVELAND 10, OHIO

Process Controls
TEMPERATURE · FLOW
PRESSURE · LEVEL
GAS ANALYSIS · RATIO



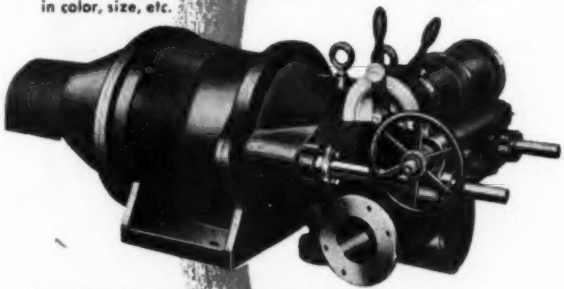
Morden-ize

YOUR STOCK PREPARATION

WITH Morden { SLUSH-MAKERS / STOCK-MAKERS / STUFF-MAKERS

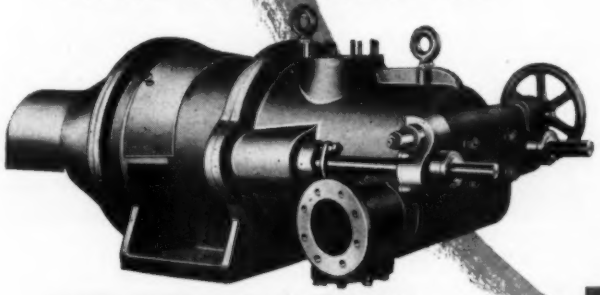
MORDEN "SLUSH-MAKER" FOR PULPING

The "Slush-Maker's" side-mounted rotor quickly and efficiently slushes a full charge of pulp, broke or waste paper, either batch or continuous. The rotor's combination pumping, shredding and brushing blades continually direct the charge at right angles against the attritioning ring, where a controlled bar-to-bar brushing completely clears all flakes and bundles, even high wet strength, without damage to the fibers. The "Slush-Maker's" positive-flow circulation quickly and thoroughly mixes and also brushes in color, size, etc.



MORDEN "STOCK-MAKER" FOR BEATING

The "Stock-Maker" with its 360° bed plate gives the maximum of brushing, fibrillating, beating or hydrating treatment with the minimum of cutting. The "Stock-Maker" operates on a continuous-flow basis from chest to chest or chest to stuff box. The reverse-flow, sealed pressure treatment of one "Stock-Maker" will duplicate or improve upon the stock treatment of two or three conventional beaters and yet requires only one-third the space of one beater.



MORDEN "STUFF-MAKER" FOR JORDANING

The "Stuff-Maker" utilizes the "Stock-Maker's" well proven construction features but provides a "jordan-type" flow, for shortening or cutting the stuff when required.

Experience with nearly 700 Morden Machines in 175 mills on all types of pulp and grades of paper proves that:

These three Morden Machines are especially designed, each to excel in one of the three phases of stock preparation—pulping, beating or jordaning.

Each of these Morden Machines is engineered for the utmost in efficiency, simplicity, versatility and economy of operation.

These Morden Machines are designed to fit readily into all types of stock preparation systems and can be used together or in combination with existing equipment to give efficiently the various treatments required for developing the most in each furnish.

Let us know of your interest, and we will gladly provide detailed information on how to advantageously Morden-ize your stock preparation system.

MORDEN
STOCK PREPARATION EQUIPMENT
MACHINES COMPANY

Corbett Building, Portland, Oregon.

The NAP must stand the gaff...

WOOL vs. STEEL

They are running paper and board machines at such terrific speeds these days that conditioners and section boxes must be installed to extract clay, dirt and ash from the felts in one continuous operation. The shoes of the conditioners are everlastingly at work on the nap of the felts—steel against wool.

No other felts can stand this gaff like Hamilton Felts! Hamilton Felts have nap in plenty. It looks soft and it feels soft because it really *is* soft. But, because it is the best grade of wool the nap of Hamilton Felts lasts longer than the edges of the steel shoes.

Ask the Hamilton Felt man about this next time he calls at your mill.

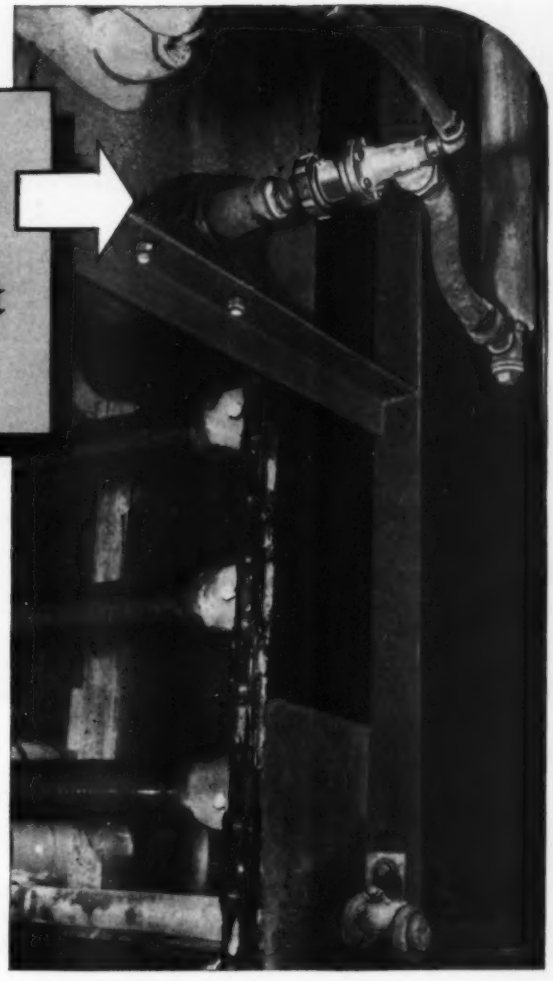
Hamilton Felts

MIAMI WOOLEN MILLS

Established 1858

SHULER & BENNINGHOFEN, HAMILTON, OHIO

"Barco Revolving Joints give us the PERFORMANCE we want on paper coating rolls!"

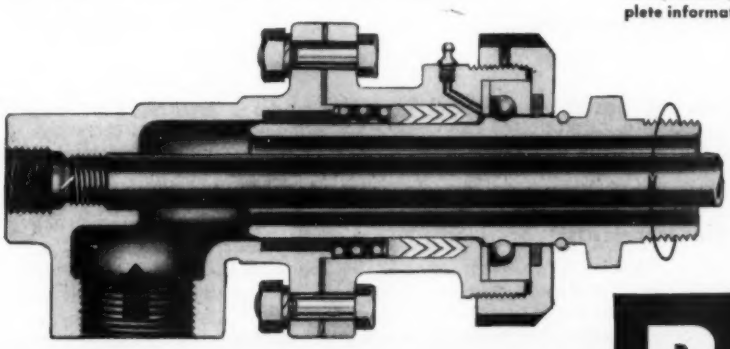


Says CHIEF ENGINEER
Francis Nelson of
Lloyd A. Fry Roofing Co.,
Summit, Illinois

■ Operating engineers throughout the country are reporting the benefits they receive from Barco's new *improved* Type IBR Revolving Joints. These are benefits that come from the *correctness* of Barco's design. There is minimum increase in torque (friction) under increased steam pressure—thanks to Barco's exclusive "CTR" V-type seal rings and ball bearings. Also note the wide spacing between bearings which holds bearing loads and wear to a minimum.

Barco builds a complete line of standard revolving joints in sizes ranging from ½" to 2" and special in sizes to 5". Pressures to 250 psi, steam, or 1000 psi, hydraulic. Speeds to 2500 rpm. *Barco Engineers are at your service; ask for recommendations.*

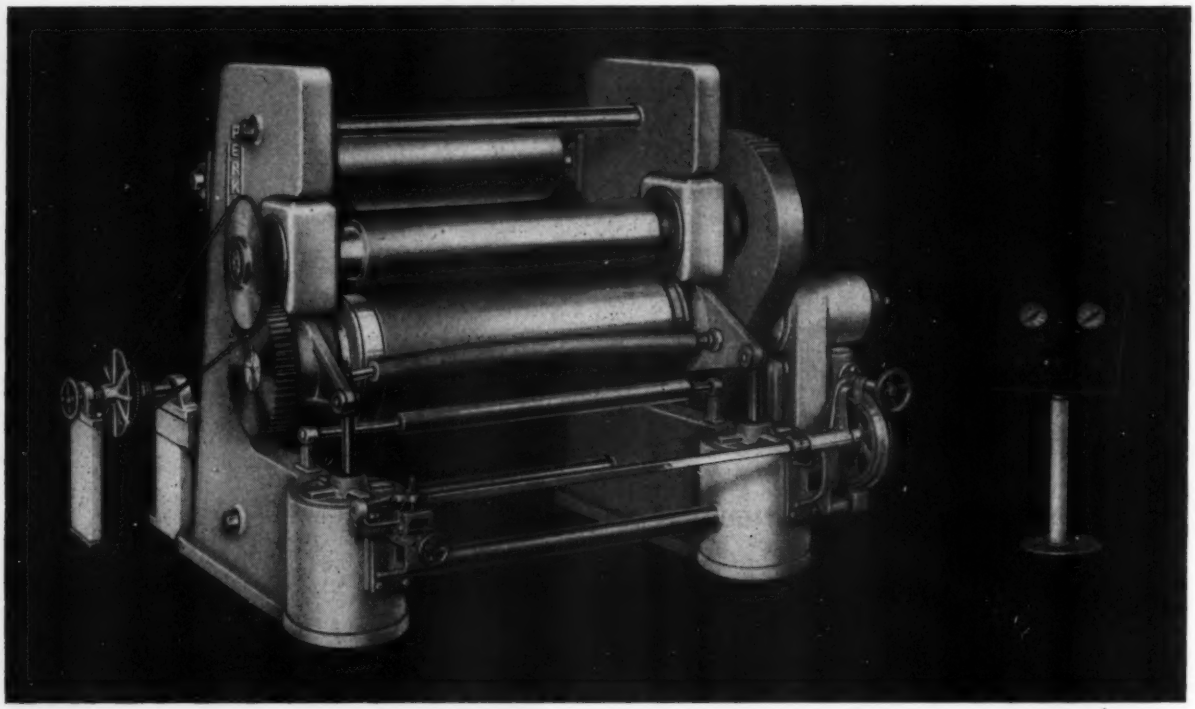
The above picture shows one of the Barco joints used by the Lloyd A. Fry Roofing Co., Summit, Ill., on a paper coating roll. For complete information on Barco Revolving Joints, send for Bulletin 300.



- **Better Temperature Control where steam is used for heating rolls, due to better circulation.**
- **Free-Floating, Low Torque Installations.**
- **Up to 50% Power Savings.**
- **Exclusive "CTR" V-Type Seal Rings—*chemically inert.***
- **Ability to Withstand Vibration and Hard Usage.**
- **Low Maintenance; No Adjusting. Holds seal running or standing.**

BARCO MANUFACTURING CO.
526D Hough St., Barrington, Illinois (A Chicago Suburb)
In Canada: The Holden Co., Ltd.

BARCO
Revolving
JOINTS
For Paper Machine Dryers, Calenders, Paper Converting Equipment



IMPORTANT EQUIPMENT FOR THE MODERN PAPER INDUSTRY . . . . .

This new PERKINS Calender is designed to meet the exacting requirements of the modern paper industry—embossing all types of papers at maximum speeds.

Specifications: 20 tons maximum operating pressure, pneumatic loading . . . anti-friction bearings throughout . . . top roll bearing boxes water cooled. . . friction brake let-off . . . friction disc clutch wind-up . . . top roll bored for heating . . . variable speed drive . . . provision for rapid roll changes . . . rugged design in accordance with Perkins standards.

B. F. PERKINS & SON, Inc.
HOLYOKE, MASS., U.S.A.
LARGEST MANUFACTURERS OF CALENDER ROLLS IN THE WORLD

When Papermaking Was the Newest Industry Under the Sun...

In the second century after Christ, when papermaking was in its infancy, macerated fibers in liquid form were poured on cloth moulds and placed in the sun to dry. The fiber was stripped from the mould after it was completely dry . . . and thus a sheet of paper was made. In America, modern high-speed machines have taken the place of ancient papermaking methods. And for more than 30 years A. E. Staley Manufacturing Company has served the progressive American paper industry, supplying high-grade raw materials to the nation's leading mills. Staley products and expert assistance can improve *your* business. Contact your supplier or write direct for details.

Quality Staley Products for Papermakers

Staley Sizing Starches
A full range of starches and dextrins for beater, surface or calender sizing.

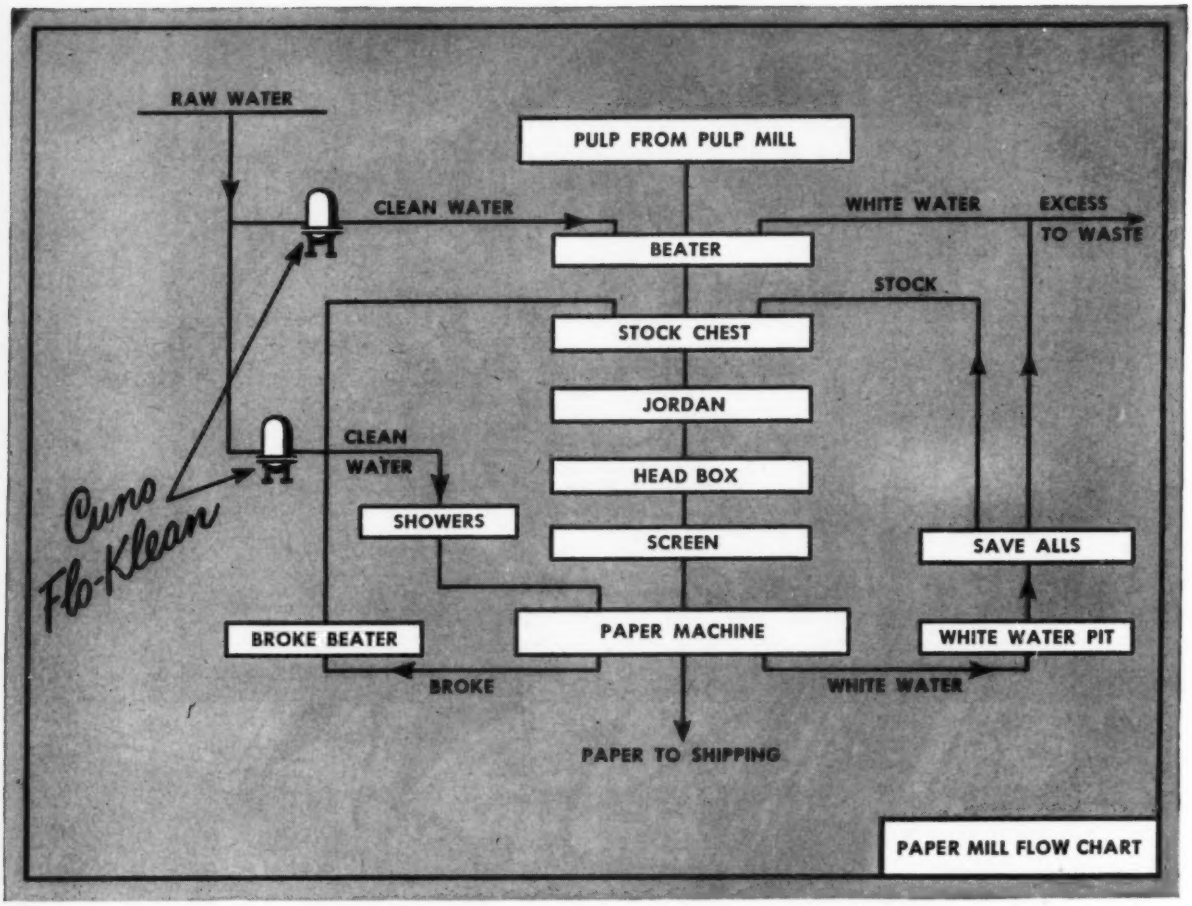
Staley Corrugating and Laminating Adhesives
Corrugating starches, special laminating and bag adhesives.

Staley Coating Adhesives
Starches and Dextrins give better results for machine or regular brush coating.

Staley Plasticizers
"Sweetose" and Staley's corn syrup are ideal softening agents for glassine paper.

PRODUCTS FROM CORN
Staley's

A. E. Staley Mfg. Company, Decatur, Ill.



Plan for longer uninterrupted production

When paper and pulp mills have clogged showers or damaged wet felts and Fourdrinier wires, it takes time and money to get going again.

Paper and pulp men have learned from experience that they can avoid costly down-time by installing Cuno FLO-KLEAN filters in their water systems. FLO-KLEAN filters remove harmful solids from river, lake or well water before equipment can be damaged.

You can install a FLO-KLEAN and forget about down-time caused by dirty water. Automatic and continuously self-cleaning, FLO-KLEAN filters are available to handle between 200 and 100,000 gallons of water per minute—with no interruption of flow, and no loss of backwash water. Pressure loss is negligible in this corrosion- and abrasion-resistant unit.

To find out how FLO-KLEAN can protect your equipment and save money write for free FLO-KLEAN bulletin to the Cuno Engineering Corporation, Dept. 393F, Meriden, Conn. F.3.3

CUNO

ENGINEERED FILTRATION

Removes More Sizes of Solids From More Kinds of Fluids

AUTO-KLEAN (disc-type) • MICRO-KLEAN (fibre cartridge) • FLO-KLEAN (wire-wound)

HERE'S HOW

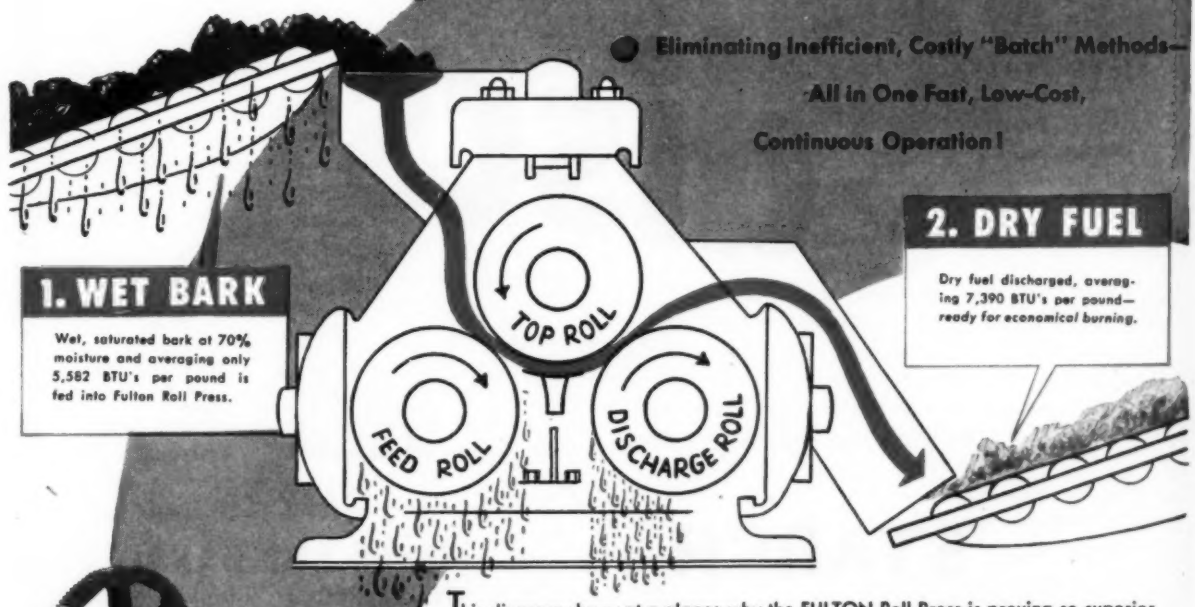
THE FULTON ROLL PRESS

Converts Wet Bark to Dry Fuel

by: ● Reducing BARK to as low as 47% Moisture, ready for instant burning!

● Adding millions of BTU's Hourly to Bark Fuel Value!

● Eliminating Inefficient, Costly "Batch" Methods—All in One Fast, Low-Cost, Continuous Operation!

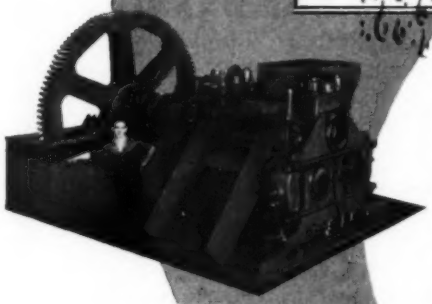


1. WET BARK

Wet, saturated bark at 70% moisture and averaging only 5,582 BTU's per pound is fed into Fulton Roll Press.

2. DRY FUEL

Dry fuel discharged, averaging 7,390 BTU's per pound—*ready for economical burning.*



This diagram shows at a glance why the FULTON Roll Press is proving so superior to obsolete "batch" methods of dewatering bark and other mill refuse. Material passes from hopper between the grooved top and feed rolls under hydraulic pressure. The combination of pressure and shredding action of the roll grooves reduces the material and expresses the water. The same process is repeated as the material passes over the turnplate and between the top and discharge rolls. This continuous "double squeeze" accounts for the amazing efficiency of the FULTON Roll Press in converting all types of wet waste woods into profitable fuel.

May we PROVE IT on YOUR material?

Represented by
E. V. Prentice Co.
2303 N. Randolph Ave. Portland 12, Oregon
W. W. Henderson & Son
P. O. Box 1085, Pensacola, Fla.

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Mail Coupon Now!

for full details and
FREE TEST RUN OF MATERIALS YOU WANT TO PROCESS

Fulton Iron Works Company, *Dept. 352*
1259 Delaware Ave., St. Louis 14, Mo.
Please send full details of FULTON ROLL PRESS
☐ We are interested in FREE test run of _____
NAME _____
FIRM _____
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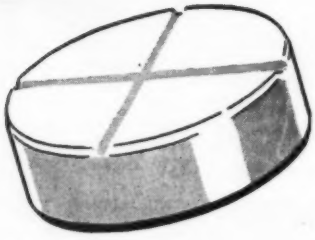
CITY _____ ZONE ____ STATE _____

FULTON IRON WORKS COMPANY
SAINT LOUIS 14, MISSOURI

MAKERS OF FINE PROCESSING AND EXTRACTION EQUIPMENT SINCE 1852

Vanzyme discs



EASY TO
STACK AND HANDLE

STARCH CONVERTER

for

TUB AND CALENDER SIZING
COATING AND
LAMINATING ADHESIVES

Increase
ACCURACY
ECONOMY
EFFICIENCY
AND SPEED

R. T. VANDERBILT CO., Inc.

230 Park Avenue, New York 17, N. Y.

The Paper Industry

March 1953

The Lignin Problem

The lignin problem still remains to be solved. Although our libraries have quite an accumulation of literature on the subject of lignin, it is surprising that—when critically examined—it yields little basic information. What lignin is, how it is linked with the cellulose fraction of wood, and what to do with it, are questions that have only been partially answered.

But the partial answers we do have and the knowledge that there is currently an annual quantity of some 8,000,000 tons of lignin not being recovered from the pulping operations' waste on the North American continent, tax our imagination in the search for an early and satisfactory solution of this problem. The question becomes even more intriguing, especially to the chemist, when he contemplates the possibilities of using lignin as a source of many valuable chemicals; while the economist's mind rebels against a practice that utilizes —even in these times of high wood cost—only 50 per cent of the total wood from pulping operations.

It is a matter of solving a simple problem in arithmetic to arrive at a conservative average estimate that, for every 1000 tons of pulp produced, there remain in the waste sulfite liquor 650 tons calcium ligninsulfonate, 150 tons fermentable sugars, 50 tons non-fermentable sugars, and 150 tons miscellaneous organic compounds.

The ligninsulfonate fraction has already aroused considerable interest in recent years because of its remarkable dispersing properties. These properties have made it a suitable material for consideration in many commercial applications such as:

(1) cement mixes where it increases the fluidity of wet cement and, by thus making it possible to use less water in these mixes, increases the strength of the cement; (2) prevention of boiler scale; and (3) drilling operation where it can be used as a dispersing agent for mud now used in these operations.

Waste sulfite liquor, as is shown in Dr. Van Horn's article in this issue, is an excellent soil binder and is now being used in Wisconsin for improving and re-conditioning old roads. It can also be used, as disclosed by Dr. Borden Marshall at the C.P.P.A. meeting:

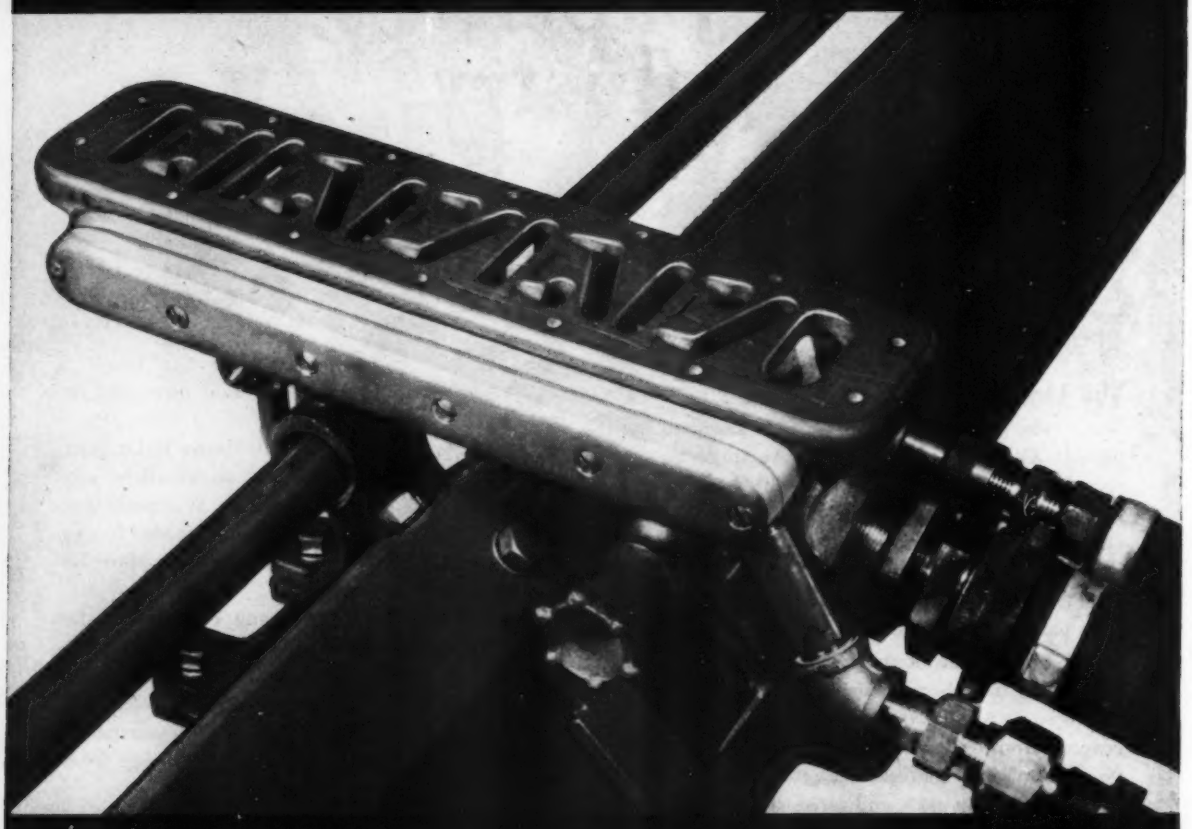
(1) as a filler and tannin-extender in the leather industry, permitting a 25 per cent replacement of costly natural tannin; (2) for conversion into a cation exchange resin suitable for softening water; (3) for conversion into an anion exchange resin capable of liberating sodium hydroxide from sodium chloride.

By far the most intriguing question, of course, is the production of chemicals from lignin. Vanillin is now being obtained, at the Ontario Paper Company's Thorold mill from a process involving alkaline oxidation of waste sulfite liquor. Provided it can be produced cheap enough, vanillin could be an ideal source of many organic compounds, especially in the high priced pharmaceutical, perfume, and plastic fields. Direct hydrogenation of lignin at high pressures is a way of obtaining high yields of propylyclohexanol derivatives; and catechol can be obtained by heating sulfite liquor with alkali, in the presence of alcohol, at high temperatures.

The lignin problem remains a major challenge to our ingenuity. It will be solved eventually, and the scientists or the group of scientists who will succeed in unraveling its complicated threads will provide their sponsors with a tremendous advantage. There is also no doubt that, before the much-heralded prophecy of pulp and paper becoming a by-product of a wood chemicals industry can materialize, we must know a great deal more about the chemical constitution of lignin, the chemicals derived from it, and more economical methods of recovering these.

A. W. J. DYCK

IT KEEPS YOUR FELTS UP



IT KEEPS UP WITH YOUR FELTS

No matter how fast they run, Vickery Felt Conditioners with "Jordan" type vacuum boxes (like the one shown) and with the new high speed drives keep your press felts continuously clean and open right through the week.

Vickery Felt Conditioners are truly low cost insurance against expensive paper machine shut-downs. In many cases their users report increased felt life as well.

For recommendations, layouts and estimates, get in touch with

BIRD MACHINE COMPANY, South Walpole, Massachusetts

Try 'em on Yankee machine bottom felts

Vickery Felt Conditioners are taking the place of wringer rolls and getting the felts so much drier that picks and breaks are no longer a problem.

THE VICKERY FELT CONDITIONER

The Paper Industry Current Comment

Priority to the budget . . . Louisiana sugar cane . . . and briar pipes

Sober second-thought is dampening the enthusiasm of those who foretold an "Eisenhower boom" as the result of the election. It is not so easy a problem as many thought to sweep back the financial tide of the 20 years of deficit spending. Already there is some doubt as to the possibility of any reduction of taxes for many months to come, and there is even doubt as to the success of the move to end the excess profits tax at the end of June. The Administration position is becoming more definitely one of budget balancing before entering upon tax reductions. In the face of these developments, however, there is gaining belief in business circles that the Eisenhower administration will be one to ultimately prove a great boon to business incentive.

The political arena at Washington is of great moment to the paper industry as well as to industry in general. Political developments of the next few months cannot fail to have their impact on the nation's sixth greatest industry. Anything which may develop as to Taft-Hartley Labor Law modifications, appropriations in continuance of foreign aid, and a definite demand by many sections of industry for further tariff rate reductions will have an effect on paper industry prosperity, possibly not immediately, but certainly in the long pull.

Production levels off

With statistics available for the industry for the complete year of 1952, it is now evident that production and consumption of paper during that year was well within 10 per cent of the record figure of 1951. Profits dropped through heavy taxes, but consumption is beginning to catch up with the plant ex pansion which was so pronounced in recent years. The most conservative students appear to agree that it will not be long before what appeared to be surplus capacity will be equalized by increasing consumption of paper and paperboard. There had been fear that expansion had reached a level of serious excess capacity, but this fear is diminishing as time progresses.

Why the problem of newsprint supply is so much to the front at Washington is no mystery, but is readily accounted for by the pressure of the publishers to ask government authority for any form of action to give them more paper at lower prices. The new Congress has disposed of the so-called Celler Committee, which operated a sharp needle for the past two sessions, but any thought that Celler's disappearance from the seat of authority will mean a cessation of the campaign is over-optimistic. A hearing before the House of Representatives Commerce Committee heard a newspaper publisher report that prices may go still higher. It was denied by another government representative that there had been any agreement between President Roosevelt and Canada under which the United States would refrain from expanding its newsprint output. This wild rumor could hardly have any basis in fact, for even the Roosevelt Administration would have had difficulty in throttling expansion of any major industry.

Not profit alone

Into this picture again came the possibility of the use of bagasse. The utilization of this product and other cellulose-producing growths, including hardwoods, was given as a not remote possibility. Publishers are trying to meet their own problem by taking over established mills and planning the construction of new plants. The economic possibility of the development of a materially greater newsprint industry in the United States is more than a matter of profits and frequently a move by the publishers to solve their problem of adequate supplies at any price. The paper industry itself, always with an eye to profit, has not been overly enthusiastic in the financing of new mill projects, except under rigid agreements with newspaper consumers.

The use of bagasse is month by month coming more and more to the fore as a newsprint raw material, and only time and experience will tell whether such use is a truly forward economic development. One of the newer practical approaches is the decision of a southern company to build a paper mill at Lockport, La. The company involved is Valite Corp. of New Orleans, which has been doing extensive research on the use of bagasse. Its principal business so far has been the use of bagasse for the production of plastics, and as Valentine Pulp & Paper Co. is planning the erection of a mill to use a new process which eliminates the earlier problem of segregating the pith from the body of the cane. It is expected to have the mill in operation late this year, if the National Production Authority grants accelerated depreciation.

As yet the Washington era of Republicanism has not seen many paper men enrolled along with the outstanding business men who have been recruited by President Eisenhower to assist him in putting business practice into effect in the nation's biggest business—the government itself. Reuben Robertson Jr., president of Champion Paper & Fibre Co., however, has gone to Germany as head of an investigative team of five prominent industrialists to survey the field and seek means of getting a dollar's worth of results for every dollar sent to that country. A number of teams have been formed to do similar studies in other countries, and the reports are expected to be given to Washington within a month. An intensive, though speedy, investigation may, it is hoped, help to cut down financial and administrative personnel waste. In another field, J. D. Zellerbach, president of Crown Zellerbach Corp., has been named as one of a panel of business men, labor representatives and public representatives to seek agreement on the form in which the Taft-Hartley Law can be modified to the satisfaction of all parts of the nation's affected area. Mr. Zellerbach was named as one of five representatives from industry.

Day by day, there are developments

in the political field, all with some form of impact on the paper industry. A condensed summary of the picture as it appears at present may not be amiss. Such items include the following:

Amendments to Taft-Hartley Labor Act are certain.

Tax reduction is in question, with the principal question being when, not if. Here there is a distinct difference of opinion as between the Administration and the House of Representatives, which is first to feel the demand from the back country that platform pledges for tax cuts be carried out at once.

The question of tariff

Tariff adjustment is in the making, but to what extent the platform pledge of continuance of present authority for further rate reductions will be countered by action under the accompanying pledge to protect domestic interests against injury is in the lap of Congress. One bill has already been introduced to throw back to Congress the right to determine whether restoration of reduced rates is justified. At present the President has the power to overrule a finding by the United States Tariff Commission. President Eisenhower has already sent back the first such recommendation by the Tariff Commission for further investigation. While the item is insignificant in itself, being the rate on briar pipes, this re-reference may be a clue to a policy which may not suit those who fear the invasion of the domestic field by heavy price-cutting foreign competition.

While these issues are pending, one radical step has already been taken in the elimination of price controls over most of the goods in the domestic market. Such controls have been entirely eliminated in the paper industry and allied fields.

Financial Reports

Paper mill securities, chiefly in the common stock field, followed the downward course of the stock market during January and February, with prices sagging perceptibly, though not in terms of a market crash. History has seen similar recessions during the first three months of nearly every year, so speculators' sentiment is not strikingly bearish.

Net incomes

Allied Paper Mills—Net profit for 1952 was $860,779, compared with $840,668 in 1951.

Brown Co.—Net income for the year ended November 30 was $4,396,967, as against $7,430,040 for the previous fiscal year.

International Paper Co.—Consolidated net profit for the nine months ended September 30 was $36,600,000, compared to $42,600,000 for 1951.

Kalamazoo Vegetable Parchment Co.—Net income for 1952 was $1,603,764 as compared to $3,797,120 in 1951.

Keyes Fibre Co.—Net 1952 income was $981,425, as compared to $1,065,917 for 1951.

Kimberly-Clark Corp.—Net income for the nine months ended January 31 was $6,346,086, a sharp drop from the $8,912,848 for the same period in 1951.

West Virginia Pulp & Paper Co.—Net income for three months to January 31 was $1,774,000, as against $2,564,000 for the comparable 1951-52 period, the drop being in part due to mill closings because of strikes.

Dividend declarations

American Writing Paper Corp. has declared a quarterly dividend of 12½ cents on the common, payable March 25 to record of March 11.

Champion Paper & Fibre Co. has declared the regular dividend of $1.12½ on the preferred, payable April 1 to record of March 10, and a dividend of 37½ cents on the common, payable March 2 to record February 9.

Crown Zellerbach Corp. has declared a regular dividend of 75 cents on the common, payable April 1 to record of March 13.

Eastern Corp. has declared a dividend of 25 cents, payable March 4 to record February 16.

Hinde & Dauch Paper Co. has declared a 40 cent dividend on the common, payable March 31 to record March 2.

International Paper Co. has declared the regular quarterly dividends of $1 on the cumulative $4 preferred and 75 cents on the common, both payable March 30 to record of February 20.

Kimberly-Clark Corp. has declared a 60-cent common dividend, payable April 1 to record of March 10, and a preferred dividend of $1, payable May 1 to record of April 10.

Minnesota & Ontario Paper Co. has announced a common dividend of 50 cents, payable April 25 to record March 31.

Northern Paper Mills has declared a quarterly dividend of $1 on the common, payable March 10 to record of February 20, and a quarterly dividend of $1.50 a share on the 6 per cent preferred.

West Virginia Pulp & Paper Co. has declared a dividend of 50 cents on the common.

Paper mill corporate changes

Camp Mfg. Co. of Franklin, Va., is to absorb Wortendyke Mfg. Co. of Richmond under an issuance of Camp stock to Wortendyke shareholders in exchange for their holdings. The move will consolidate the present close relationship between the two corporations and will result in an integrated operation of Camp's paper production and Wortendyke's converting operations.

Crown Zellerbach Corp. has offered stockholders of Canadian Western Lumber Co. Ltd. one share of C-Z stock for each six of Canadian Western. A merger would mean the formation of a new $35,000,000 timber-newsprint empire. Directors of Canadian Western have recommended acceptance of the offer. . . . The Crown Zellerbach board of directors has also voted a two-for-one split-up of its common stock. Solely for

the purpose of convenience, this split-up will take the form of a stock dividend, which will be distributed April 24 to record of April 10.

Federal Paper Board Co. of New Jersey has filed with the SEC a proposal to offer 200,000 shares of common stock, to be derived from present holdings and not as a new issue. The current owners will still hold more than half of the firm's stock. The company's net sales run to more than $25,000,000 annually.

Gary Paper Mills of Gary, Ind., has been acquired by Superior Newsprint Mills of Indiana, a new company comprised of Texas newspaper officials who plan to use the Gary mill for producing newsprint for the Texas papers by the use of deinked paper. The same group is planning similar projects in California, Georgia, and Pennsylvania.

Marathon Corp. has proposed the acquisition of Northern Paper Mills, Green Bay, by an exchange of stock, the merger being subject to approval by Northern stockholders. Under the proposed merger, Northern will retain its trade name and continue to operate, but as a Marathon subsidiary.

River Valley Tissue Mills Inc. of Phoenix, N.Y., has been purchased by Osborne Paper Mill Equipment Corp. of Fulton, N.Y. It has not been decided whether River Valley, which operated until last August, will resume operations or be sold. The property was purchased from River Valley's bondholders.

New York Stock Exchange—Stocks

	Closing Prices Feb. 19, 1953	Jan. 20, 1953
A.P.W. Products	4⅝	* 5– 5¼
Celotex	17⅞	17⅞
Same Preferred	* 16 – 16¼	16¾
Certain-Teed Products	14¼	14⅞
Champion P&F Co.	30½	37
Same Preferred	*101¾–102	*101 –102
Chesapeake Corp.	30⅜	* 30 – 30¼
Continental Diamond	12⅜	12½
Container Corp.	42¼	41½
Same Preferred	101¾	*101¾–103½
Crown Zellerbach	65½	63
Same Preferred	*101⅛–101¾	*101⅛–103
Dixie Cup	* 37 – 37⅝	36¾
Eastern Corp.	* 16 – 16¼	17
Robert Gair	19½	20
Gaylord Container	25⅜	26⅜
Hammermill	15⅛	16
International Paper	53⅞	54⅝
Same Preferred	100½	*100¾–102½
Kimberly-Clark	43⅝	45¾
Mac Andrews & Forbes	44⅝	44
Marathon	23¼	23¼
Masonite	23⅞	24
Mead Corp.	* 25⅛– 25½	27
Same Preferred	* 91½– 93	* 92½– 93
National Container	10½	11⅜
Rayonier, Inc.	29	33¼
Same Preferred	33⅜	34⅝
Scott Paper	53	55¼
Same $3.40 Preferred	* 87 – 88	* 85– 85⅝
Same $4 Preferred	*104 –105	*103½–105
St. Regis Paper	19½	19⅞
Same Preferred	93	* 93 – 94
Sutherland Paper	25½	26
Same Preferred	*106 –107	*105⅝–107
Union Bag & Paper	47⅛	48⅝
United Board & Carton	14	14⅞
United Wall Paper	3¼	3½
Same Preferred	* 25 – 26	25⅝
U.S. Gypsum	114½	119
Same Preferred	*171½–174	*172 –174
West Virginia P. & P.	* 79 – 81	* 78 – 79⅜
Same Preferred	*107¼–107¾	*108 –108½

New York Stock Exchange—Bonds

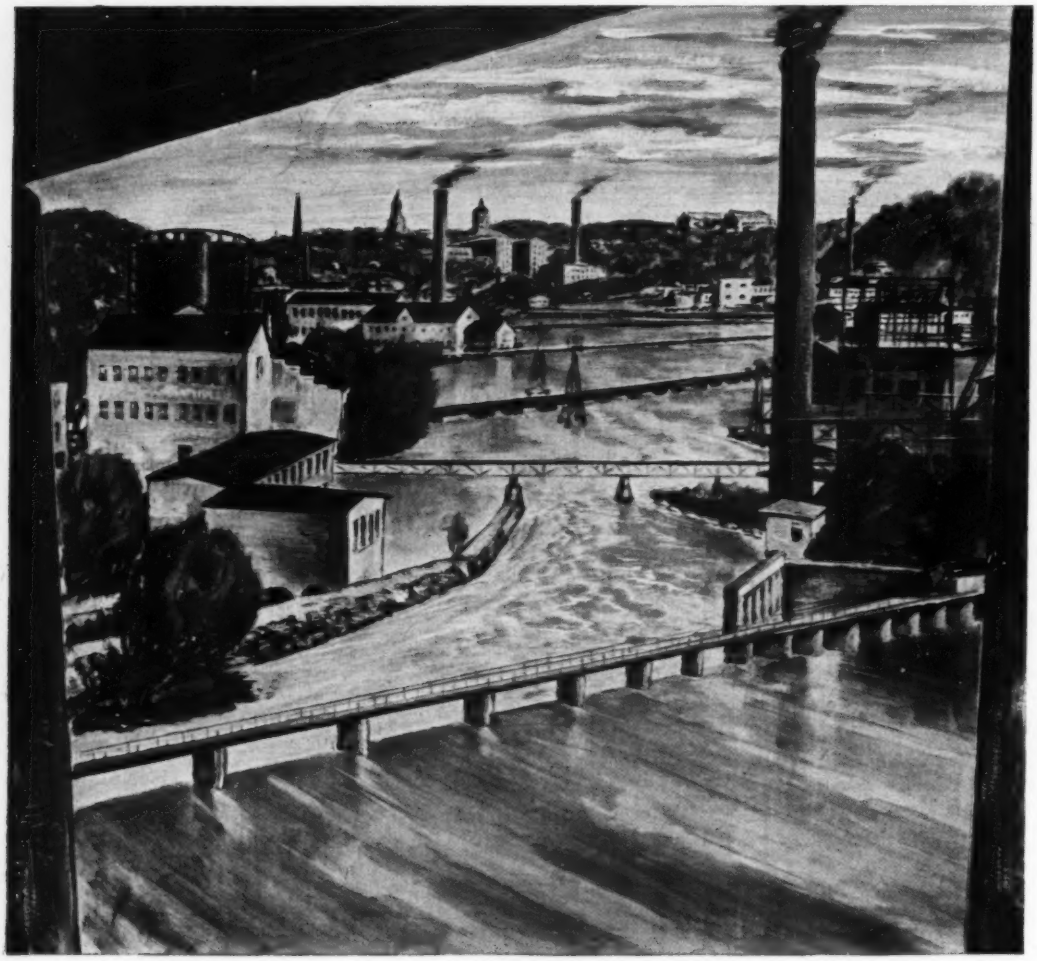
Celotex 3½%	.....	.....
Champion P&F Co. 3%	.....	99½
Mead Corp. 3%	.....	.....

American Stock Exchange—Stocks

Am. Writing	9⅞	9¾
Brown Co.	10¼	10¼
Brown Co. $5 Preferred	96½	99½
Same Preferred $3	48	48½
Great Northern Paper	56	55½
Puget Sound	29	29½

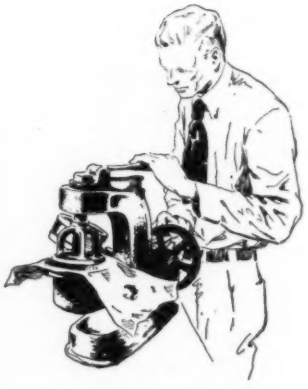
*Closing Bid and Asked Prices

APPLETON - - - - - - - another in a series of scenes... areas where Appleton Wires serve the paper industry.



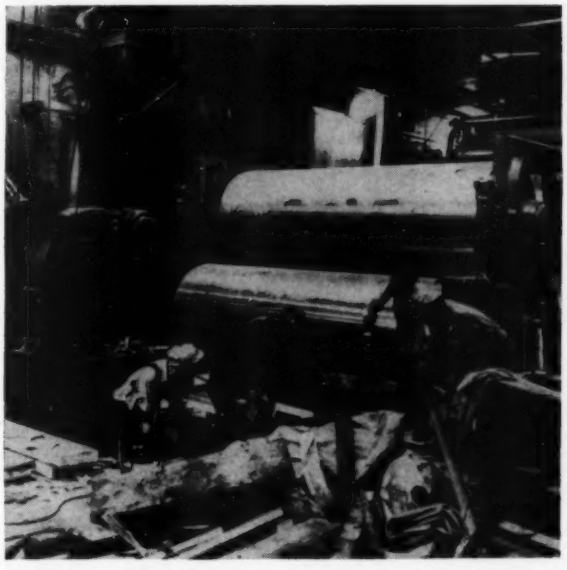
HESITATE here for a moment on Memorial Drive Bridge and glance downstream. This is Appleton, Wisconsin...a busy town...a beautiful town ...a pleasant blending of culture and hospitality, higher education, industry, science and agriculture. We are proud of our home town.

Right here at home, in the heart of the Fox River Valley, you'll also find the paper industry. All of these neighborhood mills know, from long experience, that *Appleton Wires are Good Wires!*



APPLETON WIRE WORKS, INC., APPLETON, WISCONSIN

News of the Industry



MANDO MODERNIZATION is well underway at Fort Frances and Kenora; to the left maintenance men are installing one of several new dryers during improvement of Fort Frances No. 5 machine, while at right is shown a hog at Kenora that effectively takes care of bark disposal

Mando Begins Modernizations at Fort Frances and Kenora Mills

WORK HAS STARTED on modernization projects for Minnesota & Ontario Paper Co.'s No. 5 machine at Fort Frances, Ont., and for its bark recovery system at the Kenora newsprint mill. The former program is to cost approximately $1,000,000. The projects are steps in the firm's program aimed at expanding and diversifying its papermaking facilities. Since 1945, more than $33,000,000 has been authorized.

On No. 5 machine a new sectional electric drive furnished by Bepco Canada Ltd. will replace an outmoded and obsolete steam drive that has been in operation for more than 36 years. Savings are expected in maintenance, steam, lubricants, and improved housekeeping conditions. Thus modernized, the 186-in. machine (widest trim sheet is 177 in.) will have a speed range of from 200 to 1,200 fpm.

Removable fourdrinier

Other modernizations include the installation of a removable fourdrinier, the installation of two straight-through suction presses, a new smoothing press, seven dryers—six additional and one replacement, and the replacement of a Pope type reel. All machine parts were supplied by Dominion Engineering Works.

A new Cameron winder will replace worn equipment. A regenerative winder drive will be installed, along with low speed in-drive elements. Air conditioning of the machine room will be expanded with the extension of the Ross hood.

Along with these improvements, No. 5 machine has individual stock cleaners for both groundwood and sulfite pulp. Electrical circuits will be revised, and the Bird screens and headbox will be reconditioned and raised. Dryer gears and bearings will be improved and calender ways machined.

Kenora bark recovery

At Kenora the Mando Canadian Division has installed a new bark recovery system to replace inadequate and out-dated equipment. A considerable reduction in costs is expected.

J. F. MacKellar, vice president and general manager of Ontario-Minnesota Pulp & Paper Co. Ltd., has reported that the system not only recovers bark but aids in the prevention of slime collection. By returning water leaving the vibrating screen to the barking drums, slime trouble is curtailed as the consumption of fresh water is lessened and the chlorine retention improved.

To enclose the new system, a special 28 by 36-foot extension was constructed on the south side of the woodroom. The steel framework was fabricated by Dominion Bridge Co. Ltd., Winnipeg.

NEWS HIGHLIGHTS

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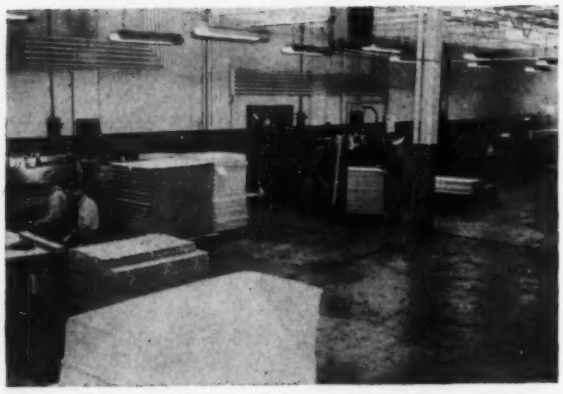


MILL FINISHING DEPARTMENT modernizations were recently completed at the Ohio Boxboard Co. plant in Rittman, Ohio; at the left is the new 85-inch Seybold ream cutter being operated by Charles Ernst; while at the right is shown the new layout of the department, with the cutters positioned along one wall of the area, the 85-inch Seybold at the extreme right

Kenora maintenance crews erected the structure and did the concrete and brick work.

Incorporation with boiler

The system has been designed to be incorporated into a bark-burning boiler for the production of power.

It includes a rotary screen, three vibrating screens, a hog, presses, and other necessary equipment. Water discharged from the barking drums first goes to an 18 by 5-foot rotary screen, furnished by Port Arthur Shipbuilding Co. Ltd. Screened solids are then sent to the hog, via a rubber belt. The hog was manufactured by Diamond Iron Works, Minneapolis. Water from the rotary dewatering screen, containing small particles of bark, is then pumped to the vibrating screens located on the mezzanine. These were constructed by W. S. Tyler Co. of Canada Ltd. Bark from the hog and the vibrating screens goes directly to the presses.

Swedish Debarker Now in Operation in Alabama

Debarking equipment recently installed by W. T. Smith Lumber Co. at Chapman, Ala., is now in full operation. Virtually all slabs and edgings are being utilized, with chips for the manufacture of paper going to St. Regis Paper Co.'s Kraft Center at Pensacola, Fla.

N. Floyd McGowin, president of W. T. Smith, explained that the Andersson debarker, which is manufactured in Sweden, is now in the production line along with new log-handling equipment which cuts and sorts the logs according to species and type.

Bark and sawdust are being used for fuel, with the remainder of the waste going to the chipper at the sawmill. Mr. McGowin said that the new system assures commercial utilization of all the saw log and promises to add substantially to the firm's wood resources.

C-Z Acquires Vast New Manufacturing Capacity Through Two Mergers

A series of consolidations that, when completed, will make Crown Zellerbach Corp. one of the world's greatest paper manufacturing firms was disclosed at the annual stockholders meeting in San Francisco February 20. Under the program Crown will acquire Canadian Western Lumber Co. and most of the outstanding shares of St. Helens Pulp & Paper Co.

The acquisition of Canadian Western is to be in the form of exchange of one share of C-Z common for each three shares of Canadian Western. Canadian Western's two most important units are the Duncan Bay newsprint mill on Vancouver Island and the Fraser River sawmill near New Westminster, B.C. C-Z and the lumber firm now own jointly the stock of Elk Falls Co. Ltd., a newsprint producer.

The acquisition of St. Helens would be on the basis of one share of C-Z for each 2⅔ shares of St. Helens. The Oregon firm is a producer of bleached and unbleached kraft, with an expansion project already underway to increase its capacity from the present 55,000 tons annually to 90,000 tons.

Westvaco Plans $3,000,000 Addition at Charleston

Plans for the construction of a $3,000,000 semichemical pulping addition to present facilities that will increase production by about 200 tons daily have been announced by L. Frank Thompson, manager of the Charleston, S.C., plant of West Virginia Pulp & Paper Co.

Engineering and designing phases of the project have been largely completed, and considerable work has been done on auxiliary projects. Preliminary construction work, such as excavation and foundation pilings, is well under way. Plant officials have reported that erection of steel will begin about May 1, and that they hope to complete the job in time for operation during the latter part of this year.

New woodyard

Necessary for the expanded pulping operation will be a woodyard for receiving and handling hardwoods, additional railroad trackage, another barking drum, additional pulpwood chipping facilities, chip conveying and storage facilities, digesters, and additional pulp washing, refining and screening equipment.

The new pulp mill will enable the Charleston plant to utilize some hardwoods, which are fairly abundant in the South, as pulp in some grades of the present product. The mill uses pine pulpwood exclusively in its present operations.

The project calls for the erection of new additions to the present chip house and the digester building. The present washer building will be altered to accommodate the new screening, refining, and washing equipment, as well as a new locker room and shower facilities for mill employees.

New rail facilities were necessary, since the freight volume has increased almost 200 per cent since operations began in 1937. On an average day the mill receives more than 90 cars of inbound freight, including approximately 75 cars of pulpwood and 15 cars of miscellaneous materials, such as coal, oil, and chemicals. About 35 cars of finished paper and paperboard are shipped on an average day.

RFC Denies Pacific Paperboard Loan

The Reconstruction Finance Corporation has rejected an application by Pacific Paperboard Co. at Longview,

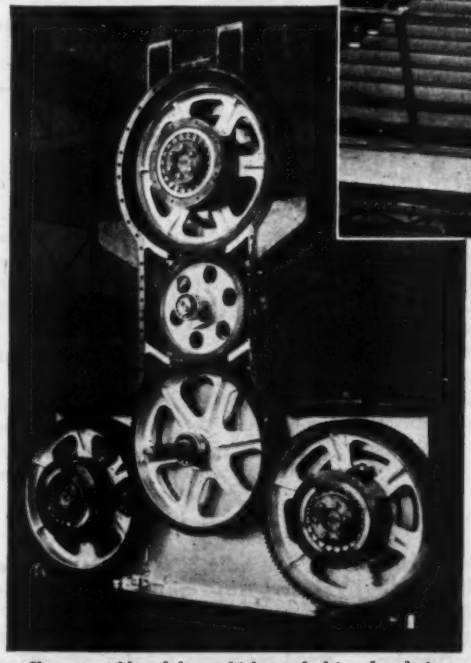
Puseyjones at Work

THE SIGN OF TRADE MARK SUPERIOR QUALITY

The Payoff is in the start-up

Fourdrinier Wire is installed by the Puseyjones "Rapi-drape" method just before the start-up at a new mill in Wisconsin.

Erection of a new Puseyjones Machine at a mill in Cali, Colombia.



Shop assembly of latest high-speed drive for drying cylinders prior to shipment to a mill in India.

At every step in the building of a papermaking machine – from the drafting board to the start-up – Puseyjones engineers are on the job. Look at the results when a Puseyjones Machine starts up. The men who designed the machine . . . the men who built the machine are working for you – demanding and getting the performance they know your machine can deliver. Call or write us about your machine problems.

THE PUSEY AND JONES CORPORATION
Established 1848. Builders of Paper-Making Machinery
Fabricators and Welders of all classes of Steel and Alloy Products
Wilmington 99, Delaware, U.S.A.

Wash., for a loan of $960,000. Officials of the government agency reported that the action was taken because the amount requested was intended for the complete replacement of a plant that was destroyed by fire, but that the company did not offer to put up any capital of its own. (The mill was razed in a $3,000,000 blaze in January 1951.)

RFC officials declared that Pacific Paperboard had had previous loans and repaid them completely out of insurance after it was burned out. Another reason given for rejecting the application was the fact that the Defense Production Authority did not certify the plant as necessary to the national defense effort.

Marathon to Construct Graphic Arts Building

Construction of Marathon Corp.'s new graphic arts building in Neenah, Wis., was to begin in February, according to an announcement by C. B. Cass, manager of service operations. The structure will house the firm's photoengraving, rotogravure and electrotype departments.

"Completion of the graphic arts building will permit consolidation of interrelated production activities and make needed space available to other departments," Mr. Cass said. Such facilities are essential to Marathon's reproduction of illustrations on protective food packages, package wrappers, and retail specialty products.

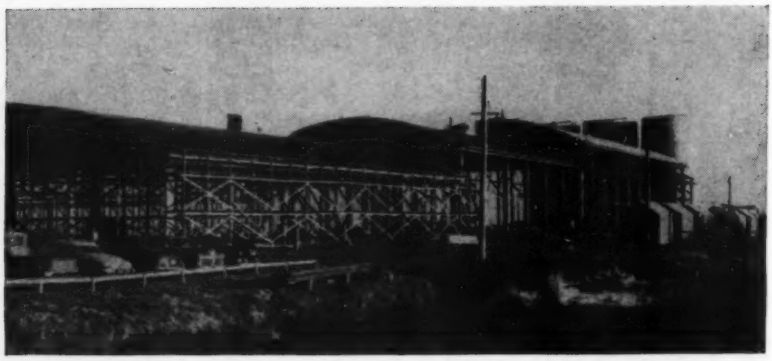
Expansion Notes

Rayonier Inc.'s
Shelton, Wash., mill, which closed January 18 because of a slump in the demand for chemical cellulose products, has reopened on a 24-hour basis.

East Texas Pulp & Paper Co.
at Evandale, Texas, a joint project of Time Inc. and Houston Oil Co., has announced that its pulp mill will be designed and built by H. A. Simmons Ltd. of Vancouver, B.C. Simmons has designed three other pulp mills since the war, one of these being the Elk Falls Co. newsprint mill at Duncan Bay.

Stone Container Corp.
of Chicago has announced purchase of the corrugated box plant of Artkraft Paper Products Corp., Pittsburgh.

Ketchikan Pulp Co.,
Ketchikan, Alaska, has announced that Harold Cavin, chief engineer, has taken permanent residence at the mill site. Mr. Cavin declared that the firm intends to start logging operations on a small scale this year as a reserve for pulping operations scheduled to start in 1954. Other key personnel of the new mill are expected to take residence this summer.



GENERAL VIEW of the Weyerhaeuser Klamath Falls fibreboard plant "under roof;" chip silos are in the background

Silo Construction Marks Progress in New Weyerhaeuser Plant

Erection of three large concrete silos and of the framework for the new Weyerhaeuser Timber Co. fibreboard plant at Klamath Falls, Ore., was well underway late in February. The new unit, scheduled for completion in the fall of this year, will be integrated with the firm's Klamath Falls sawmill, box shook plant and Pres-to-log plant. Construction work was also proceeding on a hydraulic log barker for the integrated operation.

The fibreboard plant, designed by Weyerhaeuser engineers, is an L-shaped building with some 65,000 sq. ft. of floor space. It will produce about 90,000,000 sq. ft. of fibreboard per year on a ⅛-in. thickness basis. Much of the raw material going into the new unit is white fir timber that has been little used for lumber manufacture. Many of the white fir trees have previously had little or no commercial value.

Equipment and processes in the new plant will permit production of a variety of fibreboard types. At the outset, these types will include hardboard, facing board, decorative board, floor underlayment, industrial board, and moldable board. The latter will be somewhat like insulation board in appearance—soft, but compressed into sheets that will stand handling during shipment. Industrial customers will use it to mold under heat and pressure such articles as auto body parts, sanitary fixtures, furniture, printing blocks, refrigerator panels, etc.

The hot-pressed, denser type of fibreboard will be used by industrial customers in making such items as auto parts, radio and television parts, displays, toys, and novelties.

Fine Papers Set Pace In Rapidly Expanding Canadian Industry

TO MEET CANADA'S EXPANDING NEEDS, the fine-paper mills have increased their output by 61 per cent in the years since 1944, says a report by the Canadian Pulp & Paper Association. Despite the extraordinary post-war demand in Canada, "the increase in the cost of fine papers to the consumer has been less than the advances in the cost of living and in the general wholesale price index."

With several basic types and more than 500 different kinds of papers, the Canadian fine-paper industry finds very little export business because of tariff barriers. As a result, virtually all the increase in the output of fine papers since the war has gone to meet the needs of Canadian consumers. "Production has grown from 68,000 tons in 1920 to 124,000 tons in 1939 and 203,000 tons in 1951."

Some 35 machines are engaged in Canadian production. These are located in 15 different mills operated by nine companies, including subsidiaries. Some of the papers thus produced are further processed in three additional coating mills. The range of products required by Canada is almost as great as in the United States market; and since the fine-paper mills were built to service only the domestic market, it has been necessary to produce these many different grades in short runs.

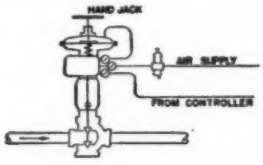
Greater Cost

CPPA points out that the economics of fine paper manufacture differ from those obtaining in other sectors of the pulp and paper industry. "The cost of wood represents a lower percentage of the total manufacturing cost. To produce a ton of fine paper requires a much greater capital outlay, and the mills employ more labor per ton. Thus, fixed

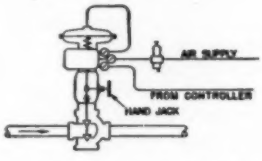
FISHER Versatile Usage

TYPICAL EXAMPLES OF FISHER DIAPHRAGM MOTOR VALVE WIDE RANGE ADAPTABILITY

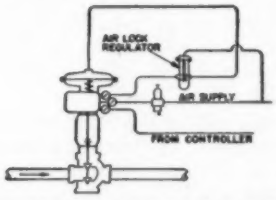
Built for your specific requirements, Fisher Diaphragm Motor Valves are manufactured to handle pressure conditions up to 10,000 pounds, for high pressure drops and are available in metals for highly corrosive service and alloys for high temperature work.



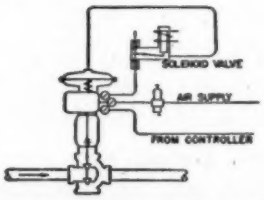
DMV with Hand Jack Operator. Allows for manual operation against spring action. Limits travel of valve. Example — Maximum opening in spring opened valve. Minimum closing in spring closed valve.



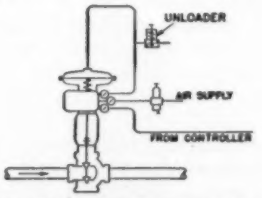
DMV with Continuously Connected Handwheel. Operator can open or close valve against controller action. Can operate valve manually if operating medium fails. Can set maximum opening or minimum closing of inner valve.



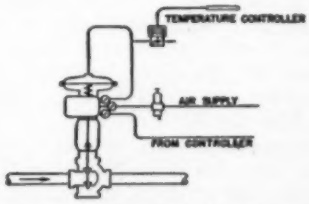
DMV with Air Lock. Should operating air supply fail, air lock regulator closes, locking pressure on diaphragm — valve remains at last position until operating air supply is re-established.



DMV with Remotely Actuated Electric Solenoid Trip Out. Valve may be fully opened or closed by unloading operating pressure from diaphragm by solenoid operation. Solenoid is actuated from manual switch or an electric tie-in circuit.



DMV with Air Cut-Out Feature. Valve member becomes inoperate, subject to manual handling to re-establish operation. When controller removes air from diaphragm, UNLOADER opens. Valve remains in this position — UNLOADER orifice is too large to allow air pressure to be re-established.



DMV — with Auxiliary Controller Over-ride. An auxiliary controller, such as temperature, placed in operating air line to diaphragm — can over-ride action of main control function by unloading diaphragm and taking over functional operation of DMV.

FISHER GOVERNOR COMPANY • MARSHALLTOWN, IOWA

charges and processing costs are substantially higher and represent a much greater proportion of total manufacturing costs. All told, the fine-paper mills provide employment for some 27,000 Canadians, of whom 6,500 work in the mills, while the remainder obtain seasonal employment in the woods.

The 500 different kinds of fine paper made in Canadian mills range from inexpensive grades made partly from groundwood pulp through a wide variety of higher cost papers made chiefly or wholly from chemical pulps and up to the finest papers made entirely from rags and selling for as much as $1,500 per ton.

Gaspesia Sulphite to Spend $4,000,000 in Conversion

Gaspesia Sulphite Co. Ltd., Chandler, Que., will spend approximately $4,000,000 to convert production from groundwood pulp to sulfite pulp. The mill, a subsidiary of Anglo-Canadian Pulp & Paper Mills Ltd., has reported that the change is being made as a result of the recent drop in the price of groundwood.

The announcement was made by Mark Drouin, a lawyer, who was appearing before the Public Bills Committee of the provincial legislature in sponsoring a bill to obtain a set valuation of the firm's properties at Chandler for a five-year period. He said that Gaspesia paid $1,200,000 annually in salaries to its employees in Gaspé and is responsible for one-third of the revenue for people of the area.

Favoring the measure was Premier Maurice Duplessis; while George C. Marler, Liberal opposition leader, although opposing the principle of preferential taxation, said that he favored the bill because of the special situation at Chandler.

It was finally decided that the firm's properties will be taxed on a fixed valuation of $2,054,700 for the next five years.

New Mill Contemplated by MacMillan & Bloedel

H. R. MacMillan, head of MacMillan & Bloedel Ltd., has declared that his company is contemplating the construction of another pulp mill on Vancouver Island, B.C. He added, however, that no plans have been prepared, and no official decision has yet been made.

At present, the firm owns and operates two pulp mills on the island. One is the Bloedel Mill at Alberni and was acquired two years ago when MacMillan Co. and Bloedel, Stewart & Welch Co. formed a merger. The other is the Harmac mill at Nanaimo, which is producing 230 tons of pulp daily and at the moment is being expanded to double that.

Timber assets of the company are some 70,000 acres owned outright and much more acreage under a forest management license in partnership with the government. The site of a possible third mill would be close to the Alberni pulp operation.

Relative Importance of Paper Types Produced in Quebec

	1951 (1,000 short tons)	1950 (1,000 short tons)	1951 ($1,000)	1950 ($1,000)
Newsprint	2,885	2,766	290,191	261,171
Book and Writing	84	77	24,999	19,936
Wrapping	149	123	27,429	20,372
Paperboard	297	254	33,530	26,361
Tissue Paper	28	27	7,219	6,333
Other	68	68	6,187	5,570
TOTAL	3,511	3,315	389,555	339,749

Growth of Quebec's Pulp and Paper Industry

	Number of Employees	Salaries and Wages ($1,000)	Gross Value of Production ($1,000)
Average 1935-39	15,080	20,043	92,707
Average 1940-44	18,316	32,130	167,964
1945	19,824	38,935	199,172
1946	21,685	48,413	265,990
1947	23,675	60,623	346,120
1948	23,894	69,148	393,347
1949	22,745	67,104	374,146
1950	22,900	72,551	421,720
1951	24,450	89,047	524,164
1952 (estimated)	24,800	94,000	525,000

Howard Smith Expansion Program Nears Completion

Post-war expansion projetcs undertaken by Howard Smith Paper Mills Ltd. are nearing completion. It is expected that the etxension to its soda pulp mill at Cornwall, Ont., will be in operation within the next two or three months. This addition will raise the firm's annual soda pulp capacity by about 25,000 tons.

Other phases of the Howard Smith expansion program have already been finished. At Ville La Salle, Montreal, installation of additional new equipment at the plant of Arborite Co., a subsidiary, was completed recently to boost capacity by about 50 per cent.

In 1952 a fourdrinier was installed at the Merritton, Ont., mill of Alliance Paper Mills Ltd. This raised the capacity of glassine, greaseproof and similar papers by about 5,000 tons annually.

Howard Smith recently announced that its plans to construct a 40,000-ton sulfate pulp mill at the Crabtree Mills Division have been deferred for the present.

Powell River Plans Use of Radioactive Materials

Powell River Co.'s newsprint mill plans the first commercial use of radioactive materials in British Columbia. Radioactive fibers will be injected into the pulp solution in the head box.

Powell River has announced that the experiment to discover what exactly happens to wood pulp fibers in the process of making paper was proposed by the Pulp and Paper Research Institute of Canada. Institute scientists are expected to begin the work this spring. The radioactive fibers will be tagged before being put into the pulp. The fourdrinier will be running at a speed of from 1,500 to 1,700 feet per minute.

Celgar Announces Preliminary Plans

Pulp, newsprint and plywood mills will be part of the $65,000,000 project of Celgar Development Co. in British Columbia, it was announced in Victoria recently. They will be the forerunners of a major innovation that will also include combined logging and sawmill operations.

Harold Blancke, president of Celgar, declared that the project would provide employment for 2,000 men near the town of Castelgar on the Lower Arrow Lakes in the British Columbia interior.

Canadian Notes

A Walkie-Talkie Signal

system has been developed to replace the present day wire signal of whistle punks in the woods. The inventor, a Seattle man, has sold his first machine in Canada for $200. The development consists of an aerial and receiver to be attached to the donkey and a 5½-lb. transmitter that can be strapped on the back of the workman responsible for signalling the donkeyman. Instructions can be given from up to 2,500 feet.

Appleford Paper Products Ltd.,

Hamilton, Ont., is planning a further extension at their recently completed Parkdale Ave. paper converting plant, including the erection of a two-story office building. Approximately 50 per cent more plant space will be provided to house the bottle cap and sales book divisions. Appleford is a subsidiary of KVP Co. Ltd.

Canadian Pulp Production

totaled 8,799,284 tons in 1952, as compared with the 9,122,229 of 1951. Production in December was 705,061, as against November's 726,746.

Barrett Co. Ltd.

has purchased Louiseville Pulp & Wallboard Mfg. Ltd., Louiseville, Que.

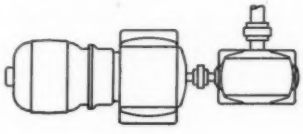
MacMillan & Bloedel Ltd.,

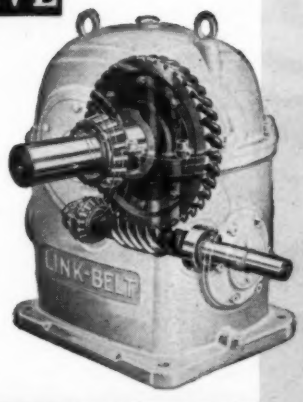
Vancouver, B.C., has undertaken the project of hand-planting 225 acres of burned-over land around Mount Benson on Vancouver Island. Two-year-old Douglas firs are being set out in the area, which had all the seed sources burned off in a fire last fall. In the spring MacMillan & Bloedel will carry

How to change even complex speed reduction problems into *simple* ones

WORM GEAR DRIVE

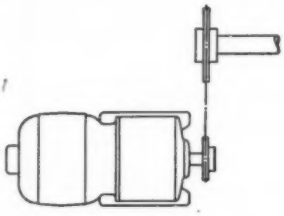
WORM GEAR and P.I.V. variable speed drives are shown direct-coupled. Link-Belt worm gear drives are available in 3.1:1 to 8000:1 reduction ratios—1400 to 123,000 in. lbs. torque—0.22 to 564 output shaft rpm. Ask for Book 2324A.





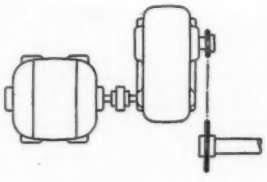
GEARMOTOR & HELICAL GEAR DRIVE

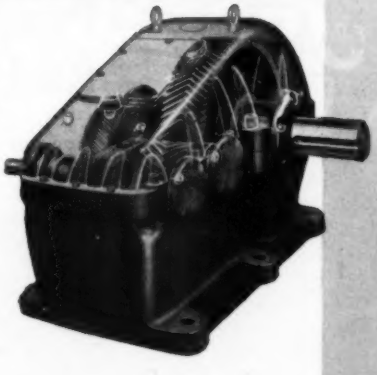
GEARMOTOR is shown with roller chain drive. Link-Belt Helical Gear Drives, Gearmotors and Motogears are available in 6.2:1 to 292:1 reduction ratios—1 to 30 hp—6 to 280 output shaft rpm. Ask for Books 2247 and 2451.



HERRINGBONE GEAR DRIVE

HERRINGBONE GEAR DRIVE is shown connected by flexible coupling to motor and with roller chain take-off. Link-Belt Herringbone Gear Drives are available in 2.84:1 to 326:1 ratios—0.4 to 2480 hp—2.2 to 623 output shaft rpm. Ask for Book 2519.





Get the proper drive combination that best meets your requirements from the broad LINK-BELT line

In addition to matching a wide range of requirements for ratio, hp, loading conditions and similar factors—Link-Belt enclosed gear drives offer you other benefits. When your Link-Belt representative selects a helical, herringbone or worm gear drive, you have no worries about coordinating it with your other components.

For Link-Belt builds a complete power transmission line. There's no need to exchange drawings with a third person to calculate chain, sprocket, coupling, bearing or even shafting requirements. You can get all these from one source . . . each pre-engineered for perfect fit.

Next time you're faced with a speed reduction problem, take it to power transmission headquarters. There's a Link-Belt sales office or distributor near you. Call today for complete engineering information.

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LINK-BELT COMPANY: Plants: Chicago, Indianapolis, Philadelphia, Colmar, Pa., Atlanta, Houston, Minneapolis, San Francisco, Los Angeles, Seattle, Toronto, Springs (South Africa), Sydney (Australia). Sales Offices, Factory Branch Stores and Distributors in Principal Cities.

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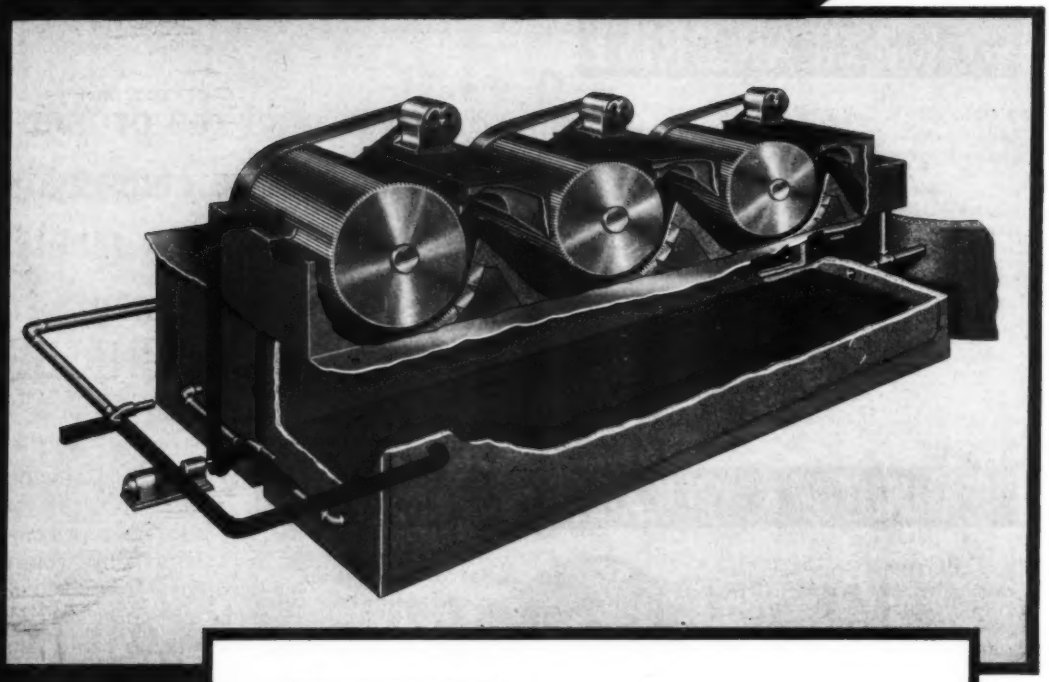

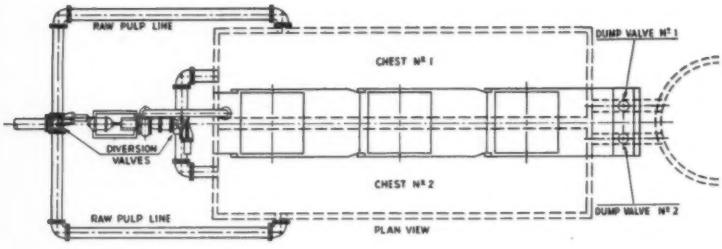

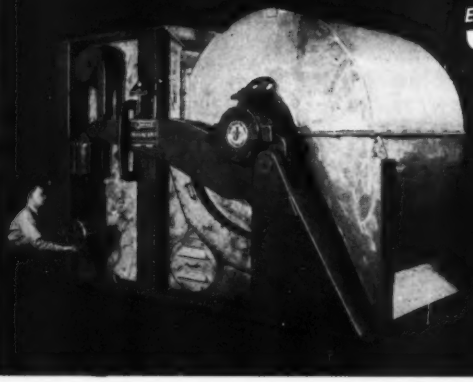

E.D. Jones **Pre-Assembled BEATING UNIT**

This easy-to-install "packaged" Beating Unit is the heart of the *Continu-flo* system. • Its pre-assembled construction means lower installation cost—no assembly in the mill
ved mechanical design

LOW OPERATING COST — WITH

E.D. Jones Continu-flo

Double-chest Batching System

Here's the answer to the problem of maximum refining quality at minimum refining cost. The only continuous batching system that guarantees full automatic control, Jones *Continu-flo* double-chest batching with Jones Beating Units offers you

Batch-refining quality with the tonnage and economy of continuous operation

Positive uniform treatment of all stock, with readily reproducible results

Greatest refining capacity and lowest operating cost per ton of any type of beating or refining system.

And no shutdowns for dumping! — because once the Microflex Control is set for the required number of passes, operation is continuous and the discharge of refined stock and admission of raw stock is automatic and simultaneous.

Ask your Jones representative or write us direct for details and drawings of this latest Jones development.

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PITTSFIELD, MASS.

OUTSTA
FEA

- More refi
to twice
lar mac
- Lowe
65%
ve
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out tree-planting on the 25,000-acre Beaufort Tree Farm on the island. This area is capable of supporting an annual cut of 6,000,000 feet.

Tasman Pulp & Paper Co. Ltd.
of New Zealand is being aided in its forestry work by foresters and forestry engineers from British Columbia. C. D. Schultz & Co. Ltd. of Vancouver has sent six men. Sandwell & Co. Ltd., also of Vancouver, are the consulting engineers for the project.

A "Fair" Year
for the forest industries in British Columbia was predicted recently by George O'Brien, vice president of Powell River Co. Newsprint demands will remain high, he said, and the market for unbleached sulfite pulp has passed its low point.

Kitimat Pulp & Paper Co. Ltd.
has recently been incorporated in British Columbia with a capitalization of $10,000. It will operate at the Aluminum Co. of Canada smelter town as a buying and selling agency for wood products and mining and other equipment.

Timber Royalty Fees
have been set up in Newfoundland for wood cut on Crown lands for certain purposes. Excluded is timber cut for firewood, fishery and agricultural purposes, birch wood for sale to Newfoundland Hardwoods Ltd., and logs cut for licensed saw mills. Previously, timber has been altogether free from royalty fees.

World-Wide Pulp, Paper Development Planned by Parsons & Whittemore

To help develop the pulp and paper industry in South and Central America, Africa and Asia, Parsons & Whittemore Inc., New York, N.Y., machinery suppliers, is launching an extensive Point Four type program under which the firm will engineer, develop and build complete pulp and paper mill projects.

The development is to be based on the pulping of short fibered material found in many parts of the world, in addition to offering equipment utilizing standard grades of wood pulp. P&W will contract to build a complete mill with any specified daily production capacity and quality and will lend assistance to local groups not only in technical and management matters but also in financing.

St. Regis interested

The company has recently concluded an agreement with St. Regis Paper Co. calling for cooperation between the two firms in the development of mills outside of the United States. Under this agreement, St. Regis would consider undertaking management contracts in mills that P&W develops, thus assuring capacity operations of a saleable product.

Parsons & Whittemore is supported in the field by The Black-Clawson Co. of Hamilton, Ohio, and its divisions—Dilts Machine Works of Fulton, N.Y., and Shartle Bros. Machine Co. of Middletown, Ohio, and their subsidiary, The B-C International Ltd., London.

The proposed program consists of (1) a preliminary survey and an appraisal report; (2) complete engineering; (3) production of all pulp and paper machinery and other necessary equipment that cannot be produced in the country where the mill is to be constructed; (4) supplying necessary trained personnel to insure proper operation until local personnel can take over; (5) assistance in financing over a period of years, and (6) assistance in obtaining the necessary raw materials and chemicals to operate the mill, as well as sell the output through P&W offices located in 14 countries.

McArdle Calls for Better Forestry Management and Cooperation

ADEQUATE FOREST RESOURCES and their proper utilization are key factors in meeting increased world needs for wood resulting from a growing population and higher standards of living, Richard E. McArdle, chief of the U.S. Forest Service, said in his 1952 annual report.

During the past year, he pointed out, the Forest Service cooperated in obtaining U.S. specialists for technical assistance missions to other countries in response to requests for help in the development of their forest resources. The service also cooperated with other public agencies and with private industry in training foreign specialists who came to this country to study American forestry and wood-utilization techniques.

To meet the growing needs for wood, Mr. McArdle recommended three lines of action: (1) better management of forest land now used for timber production; (2) prompt reforestation of understocked and deforested lands, and (3) the opening up of undeveloped timber resources, especially large areas of tropical forests.

1952 highlights

Mr. McArdle listed the following as among the principal U.S.F.S. accomplishments in 1952:

1. National forest receipts from the sale of timber, grazing permits, land-use permits, and water power rights reached the all-time high of $71,402,511, as compared to the $60,018,940 of 1951.

2. The Engelmann spruce bark beetle epidemic in Colorado was brought under control. Some mop-up work may be needed during this year and next.

3. The Forest Service cooperated with 38 states to provide technical assistance to forest land owners. In this program some 250 state-employed foresters assisted 27,933 woodland owners in establishing better management practices on 2,501,317 acres. Extension foresters at land grant colleges, who cooperate with the U.S.F.S., made marked progress in providing farm owners with educational assistance in woodland management.

4. The states, with the cooperation of the service, distributed 292,000,000 trees to provide private landowners at nominal cost for planting farm wood lots, shelterbelts, and windbreaks. In addition, 49,640 acres of national forest land were planted.

5. Continued research was directed toward the development of more efficient management, protection, and utilization of the renewable resources of timber, range and water at Forest Service experiment stations and the Forest Products Laboratory at Madison, Wis.

Shirley Urges Cooperative Aid for Forest Industries

The pulp and paper industry may anticipate greater cooperation this year between the government and private enterprise in applying research and technology toward expanded output and improved products, Dr. Hardy L. Shirley, dean of the New York State College of Forestry, said recently in Syracuse.

Dean Shirley suggested the following program: (1) Ending the feeling of competition between the government and industry in the purchase of timber land; (2) larger expenditures to fight destructive insects and fungi; (3) conservation improvement through the utilization by pulp and paper mills of otherwise unusable wood; (4) making forest and sawmill work safer and more attractive, and (5) collaboration in a study of forest resources and future needs.

Forestry Notes

Crown Zellerbach Corp.
on February 13 planted the 6,000,000th timber seedling to be set out since World War II on its tree farms in western Oregon and Washington. The ceremony

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actually require
less maintenance
And the proof lies in the actual records of the thousands of Powell Valves that are serving all branches of industry.
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DEPENDABLE VALVES
SINCE 1846
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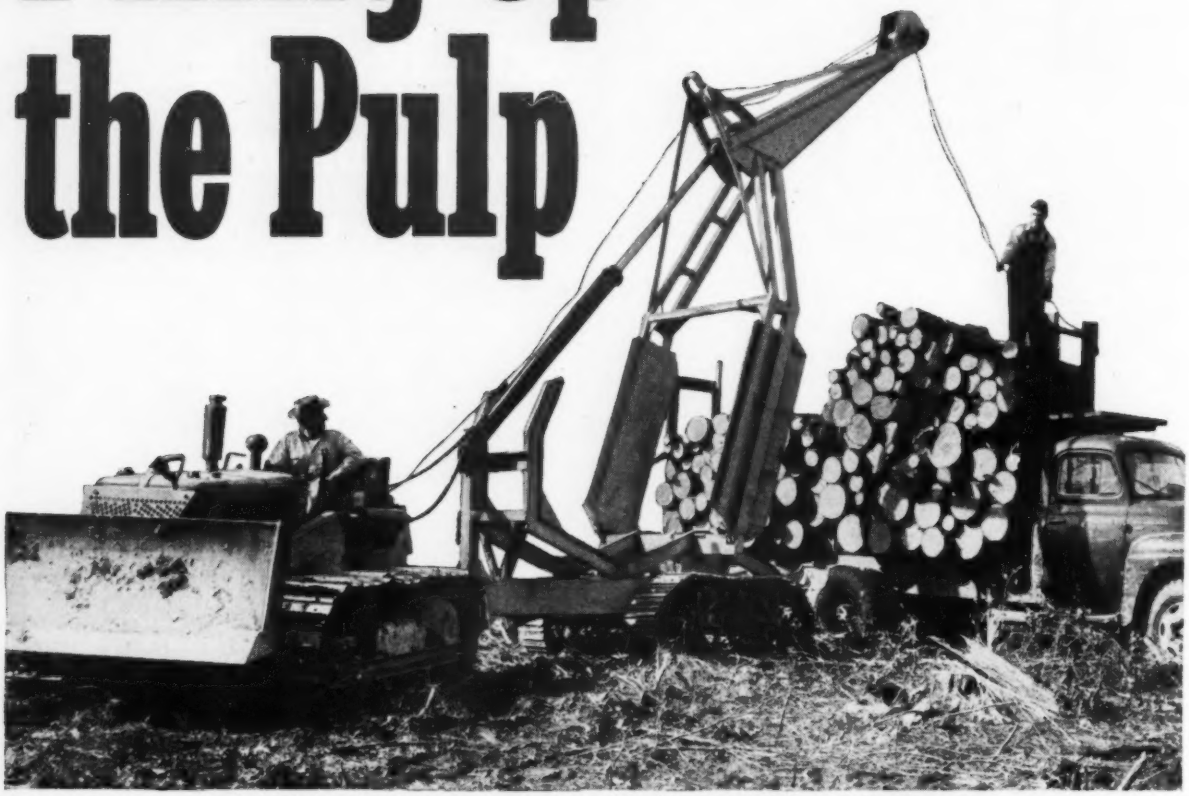
Piling Up the Pulp



LOADS LOGS LIKE MATCHES. This International TD-14A takes time off from building roads to load a truck with a special arch boom loader designed by International Paper Company engineers.

International power speeds up work for International Paper

Down on their 300,000 acre stretch of Louisiana timberland, the Southern Kraft Division of International Paper Company uses crawlers to get out their pulpwood.

For example, in the "Olla Block," there are two TD-14As, and a TD-9 building roads, skidding logs, and even loading pulpwood on trucks. They find these rugged, reliable IH crawlers are really right for work in the woods.

Ask your International Industrial Distributor for details on the complete International line. Whether your woods show is large or small, see how International "Power that Pays" can pay off for you!

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POWER THAT PAYS — INTERNATIONAL HARVESTER — **INTERNATIONAL**

was staged near Astoria, a stone's throw from old Fort Clatsop, where Lewis and Clark camped over the winter of 1805-06.

American Forestry Association
has called for an American Forest Congress to be held October 29-31 in Washington, D.C. Conservationists from all over the country will examine all aspects of forest management and protection on private and public lands. The Congress will be the fourth in the 77-year history of the association. The first was staged in Cincinnati in 1882.

The Proposed Wood Products Building
at the New York State College of Forestry, Syracuse, for which Gov. Thomas Dewey asked the state legislature for a $3,000,000 appropriation, will be devoted entirely to instruction and research on forest products. Among the departments to be housed in the new structure will be wood technology, forest utilization, and forest chemistry.

Man-made Rain
may become a potent weapon against the costly electrical storms that menace the Northwest, according to Vincent J. Schaefer, General Electric Co. scientist. He said that 25 fire-watchers will work this summer in Montana and Idaho gathering weather data to be used by the Munitalp Foundation in New York, N.Y., and the U.S.F.S.

An Oriental Scale Insect
that attacks conifer trees has been discovered infecting Austrian pines near Baltimore. This is the first record of this insect in the United States, according to Dr. William W. Cantelo of the Bartlett Tree Research Laboratories in Stamford, Conn.

Bark Beetles
have invaded Florida's pine forests and have killed millions of trees, according to Forester L. T. Nieland of the University of Florida's agricultural extension service. The beetles have reached epidemeic proportions in some parts of the northeastern section of the state.

Potlatch Health & Welfare Fund Approved by Court

A $770,000 health and welfare agreement between Potlatch Forests Inc., Lewiston, Idaho, and its 3,100 employees was approved recently by the Ninth Federal Circuit Court of Appeals in San Francisco. The court rejected an appeal by 109 employees, who had filed suit against the agreement claiming that their rights had been violated because they hadn't been consulted.

The court ruled the agreement valid because the second party to the plan, the CIO International Woodworkers of America, had the authority to speak for all employees.

The agreement provides that the company set aside 7½c per hour for each employee to build a maximum fund of $770,000. Administrator is the North Idaho Medical Service Bureau located at Lewiston.

BASE MATERIALS and the numerous end products were displayed by Brown Co., Berlin, N. H., recently during New England Week at Jordan Marsh Co., Boston department store; at the left is Laurence F. Whittemore, president of Brown, as he chats with Downing P. Brown, vice president in charge of sales

Westvaco Gets Government Reimbursement

West Virginia Pulp & Paper Co. at Charleston, S.C., will be reimbursed by the federal government for wartime expenses, it was announced in Washington, D.C., recently by the United States Court of Claims. The court found that the company had to spend "substantial sums" relocating machinery and equipment when the government occupied part of the land the firm had leased on the Cooper River.

The government used the property from 1941 through 1947 for Army warehousing and docking facilities. The land was originally acquired by federal authorities as a World War I port of embarkation. In 1936 it was transferred to the City of Charleston, with provisions for the government to recover the area in a national emergency. Later, Westvaco was granted a 50-year lease at $1 per year on 420 acres. It spent approximately $11,000,000 on a new paper mill and other improvements. The amount of compensation the firm will receive is to be determined by a Claims Court commission.

Crossett Begins Tall Oil Production

TALL OIL from sulfate wood pulp skimmings is being produced in Crossett, Ark., by Crossett Chemical Co. in a new plant that went into operation in January. According to E. M. Godat, manager, the capacity of the unit is approximately 6,000 tons per year.

The new installation was designed by Dr. Arthur Pollak, New York, N.Y., authority on the technology and uses of tall oil and other pulpwood derivatives. The production potential is four times the present rate, and future plans call for the manufacture of refined as well as whole tall oil. Crossett Chemical is a division of Crossett Lumber Co. The latter also operates Crossett Paper Mills.

Dr. Pollak, who did the detailed drawings in addition to designing the plant, also specified the equipment. Rust Engineering Co. of Pittsburgh was the builder. Ample storage capacity, close processing control and ideal transportation facilities are outstanding features. Other Crossett chemical products include methanol, acetic acid, and charcoal.

The tall oil plant is another in a series of expansions undertaken by the various Crossett operations since World War II. Crossett Paper recently completed a thorough expansion and modernization program.

1952 Pulp Production Takes Slight Dip

Maintaining operations at a high level throughout 1952, American pulp producers nearly duplicated their record output of 1951. Imports declined, and in consequence the new supply fell below the 1951 figure, but it still exceeded by a considerable amount the record of any other year.

In his yearly summary of the wood

pulp picture, L. Turcotte, president of Puget Sound Pulp & Timber Co., reported that new supply provided by domestic manufacture and imports amounted to 18,200,000 tons in 1952, as compared with the 18,700,000 tons of the previous year. Indicating the "sturdiness" of the 1952 record, he observed that it compared with 1950's 17,138,000 tons and 1943's 10,685,000 tons.

Domestic output was virtually unchanged at 16,462,000 tons in 1952, as against 16,555,000 tons in 1951. Pulp imports declined from 2,361,000 tons to 1,937,000 tons. Exports were about even, 199,000 in 1952 vs. 196,000 in 1951. Thus, practically all of the year's reduction in new supply occurred in the decline of imports.

A shift in the source of our imported pulp—more from Canada, less from overseas—was observed by Mr. Turcotte as a trend of interest and possible significance. In 1952 Canada shipped 1,578,000 tons of pulp to this market; Scandinavian and other overseas suppliers sent us 359,000 tons. In 1951 the division was 1,877,000 tons from Canada and 484,000 tons from overseas. And in 1939 the figures were 638,000 tons from Canada and 1,388,000 from overseas.

30 Million Gallons of Waste Liquor Contributed for Wisconsin Road-Building

TWELVE WISCONSIN pulp and paper mills contributed more than 30,000,000 gallons of spent sulfite liquor for road construction during 1952. According to a report appearing in the *Milwaukee Journal*, this tremendous gallonage went for the improvement of some 2,490 miles of state, county and township highways. While Wisconsin mills are spending millions of dollars to find other disposal methods, research engineers contend that sulfite's highway possibilities have not been given a fair trial.

"All we are asking is that the State Highway Department and the counties make a thorough test of the material," Walter A. Sherman, sulfite superintendent at Flambeau Paper Co., Park Falls, states. "The result of its use would at least justify such a trial."

Use of waste liquor in treating worn roads was tested years ago, but nothing much came of it until the state began strict enforcement of anti-pollution laws. Its possible use on highways came to the fore when it was noted that, when sprayed around mill yards, it kept the dust down, with its glue-like quality giving the loose gravel a hard surface.

Tremendous saving

"Public road men are beginning to see the tremendous savings possible in the use of sulfite roadbinder," says Harold Larson of Consolidated Water Power & Paper Co. at Wisconsin Rapids. "If a dollar's worth of roadbinder saves $3 worth of grading cost and road materials that would ordinarily be worn away by traffic, the local government will save $2."

During 1952 more than a dozen counties used the free sulfite on gravel or macadam highways. They used large amounts on repair work. Most county engineers report that they are satisfied with the hard surface.

Northern tops

Northern Paper Mills of Green Bay leads all Wisconsin paper firms in the distribution of sulfite waste for roadbuilding. It is in wide-spread use in Brown County. During 1952 Northern furnished 11,143,000 gallons for the treatment of more than 900 miles of highway. The distribution records of other mills in the road construction and repair field is as follows:

Kimberly-Clark Corp., Neenah and Niagara, 6,000,000 gallons; Flambeau Paper Co., Park Falls, 5,215,000; Falls Paper & Power Co., Oconto Falls, 1,777,900; Consolidated Water Power & Paper Co., Wisconsin Rapids, 1,059,000; Sterling Pulp & Paper Co., Eau Claire, 926,500; Badger Paper Mills Inc., Peshtigo, 512,000; Rhinelander Paper Co., Rhinelander, 450,000; Hoberg Paper Mills, Green Bay, 288,000; Nekoosa-Edwards Paper Co. Inc., Port Edwards, 100,000, and Marinette Paper Co., Marinette, 100,000. (Munising Paper Co., with headquarters in Munising, Mich., but with mills in Wisconsin, added 1,512,000 gallons to the total.)

A recent survey has showed that about 12,000 gallons of sulfite are used on each mile of road.

So far, State Highway Department authorities are not too keen about using sulfite for road work, but they maintain that recent experiments have warranted a complete trial and study this year.

"Our observation is that the use of sulfite for roads has limited value and merit," according to M. W. Fisher of Madison, maintenance engineer of the State Highway Department. "I think the research work and tests should be continued. We have had a look at the blacktop repair jobs. So have other state engineers. We are not satisfied with the results, especially where there is heavy traffic. The beating that a road takes is terrific."

Bergstrom's $285,000 Filter Plant in Operation

Bergstrom Paper Co., Neenah, Wis., has started operation of its $285,000 filter plant for settling out wastes from its deinking process. The start-up climaxes more than 20 years of research into the problem at a cost of nearly $1,000,000. Construction work was started a year ago. The plant is reportedly the first of its kind in the country.

The new operation can handle about 600,000 gal. daily of the deinking process wastes. The wastes are first piped into a primary settling tank capable of handling 110,000 gal. on a continuous flow basis. The heaviest solids are settled out and then enter a filter tank, where the liquid substance is drained off and flows into large compaction tanks.

Solids are again settled out and compacted in these tanks and then pumped into the large vacuum type filter, where the clay sludge is taken off and put on a conveyor that dumps the gray sludge into trucks. The sludge is then emptied as fill in the 35-acre Lake Butte Des Morts.

Hoberg Paper Mills,

Green Bay, Wis., has been granted additional time in which to complete work on its pollution abatement facilities. The Wisconsin State Committee on Water Pollution has announced that Hoberg has been given until December 31 to finish construction of a new sulfite liquor collection system and yeast plant.

Consolidated Water Power & Paper Co.'s

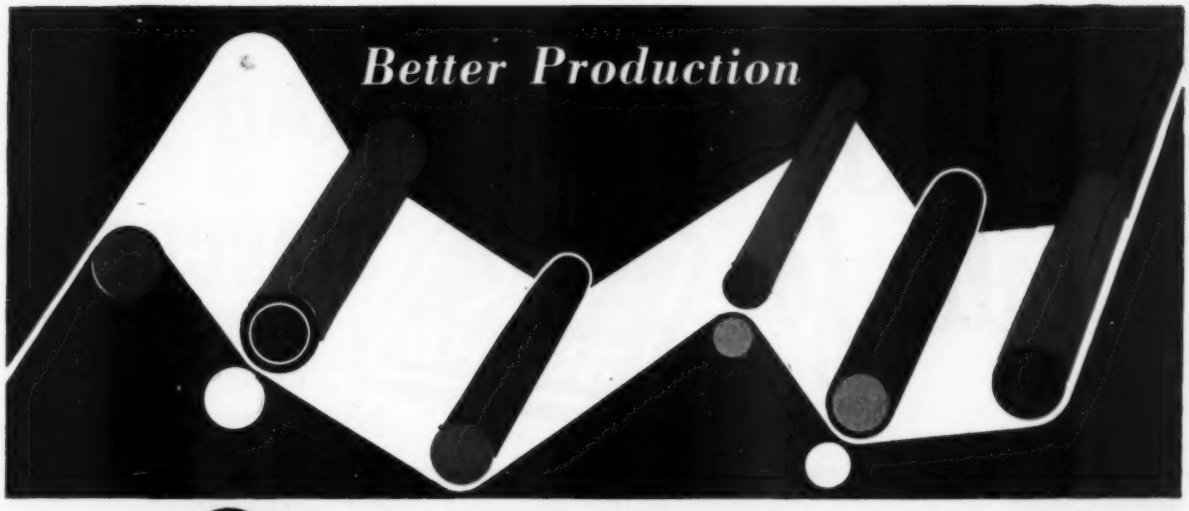
Wisconsin River Division at Whiting, Wis., is now operating a new plant to reduce stream pollution. Installations include an Imhoff primary digestion plant for a designed population of 200 and 24,000 gallons daily flow, two sludge-drying beds, piping, and auxiliary equipment. Cost of the plant was $35,000.

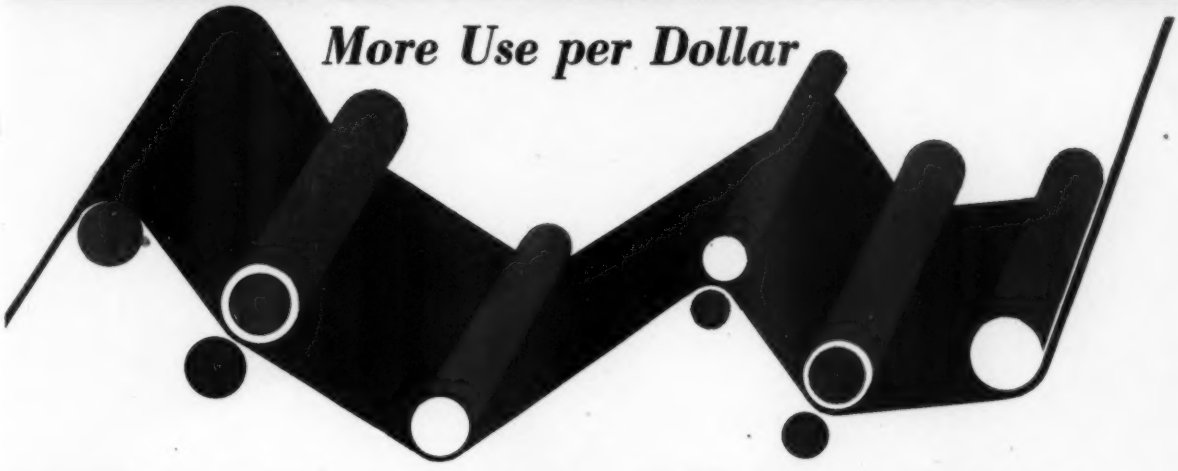
W. Michigan College Launches Second Lecture Series

The second semester's lecture series on the Converting of Paper and Paperboard was launched at Western Michigan College, Kalamazoo, February 16 with talks on "Asphalt Saturation and Lamination of Paperboard." Speakers were R. J. Suess and R. E. McVicker, both of Ostego Falls Paper Mills Inc., Ostego.

Among the remaining lectures in the series are the following: March 23—"Molded Paper Products," W. E. Parsons, president of Keyes Fibre Co., Waterville, Maine; March 30—"Wallpaper," R. L. Boyd, vice president of United Wallpaper Inc., Chicago.

April 13—"Paper for Military Uses,"





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You get better production with Manhattan rolls, because they maintain uniform density and perfect crown . . . because they don't oxidize, harden, corrugate or crack . . . and because there can be no separation of rubber from metal core. Yes, Manhattan Rubber Covered Rolls give you better production—and they do this long after you would have to replace other rolls. That's what we mean by MORE USE PER DOLLAR. A specialist from the R/M roll covering plant nearest you will cheerfully advise you or quote on your specifications. Call him next time.

ROLL COVERING PLANTS AT PASSAIC, N. J. . . . NEENAH, WISCONSIN . . . NORTH CHARLESTON, S. C.

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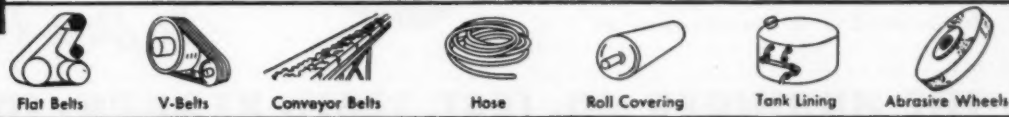

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Some of the industry's outstanding experts in the use of starch in paper making are on the staff of Hubinger's famous laboratories. You are invited to consult these experts on your production problems—without cost or obligation on your part.

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E. T. A. Coughlin, chief of the pulp and paper section, Department of Defense, Office of the Quartermaster General, Washington, D.C.; April 20—"Baryta Coated Photographic Papers," William A. Kirkpatrick, technical director of Allied Paper Mills, Kalamazoo; April 27—"Paper Base Laminates," J. E. Kussman, resident manager of the Panelyte Division, St. Regis Paper Co., Kalamazoo.

May 4—"Vulcanized Fibre Products;" May 11—"Specialty Impregnation;" May 18—"Cores, Spools, Bobbins and Cones;" May 25—"Electrical Insulation Papers;" June 1—"Testing of Converted Paper and Paperboard," Dr. Harold Wiles and E. E. Stephenson, Sutherland Paper Co., Kalamazoo.

11 Paper Firms Receive Management Award

Certificates of Management Excellence for the year 1952 have been awarded to 11 paper companies by the American Institute of Management, New York N.Y.

Seven of the firms received the award for the third consecutive year: Champion Paper & Fibre Co., Hamilton, Ohio; Crown Zellerbach Corp., San Francisco; Great Northern Paper Co., Boston; Marathon Corp., Rothschild, Wis.; Scott Paper Co., Chester, Pa.; St. Regis Paper Co. and West Virginia Pulp & Paper Co., both of New York, N.Y.

Three received it for the second time: International Cellucotton Products Co., Chicago; Kimberly-Clark Corp., Neenah, Wis., and Northern Paper Mills, Green Bay, Wis. The Brown Co., New York, N.Y., obtained the award for the first time this year.

According to Jackson Martindell, president of the Institute—a non-profit foundation devoted to the improvement of corporate policies and practices—only 330 companies in the United States and Canada, out of the 3,000 leading concerns whose methods were studied, were found eligible to receive the designation.

Canadian Newsprint Price Going Up; U. S. May Follow Suit

CANADIAN CUSTOMERS of Abitibi Power & Paper Co. Ltd. have been advised that the price of its newsprint has been increased $10 a ton, effective January 1. This boost is the same as that put into effect for United States consumers last June 15. The latter did not apply in Canada.

Some other Canadian newsprint producers are also understood to have advised their customers of the increase. However, none had made an official announcement by the middle of February. The Abitibi increase was made known by customers who received notices.

As a result of a $10 increase, the Canadian base-area price will be $122 per ton. Canadian publishers also pay a federal 10 per cent sales tax on all but the transportation cost. Accordingly, their newsprint price with the increase will be about $133 a ton in the base-area, with higher prices in other parts of Canada. (The U.S. price remains at $126, landed in New York, N.Y., with higher prices in various areas.)

During January Premier Duplessis of Quebec declared that he thinks that Quebec newsprint firms "will cooperate" with his government in giving special price consideration to newspapers in the province. He said that he could give no details of the arrangements with the various companies at the time being.

"We have met with executives of the newsprint industry and discussed various aspects of the newsprint price problem," he said. "I believe that the interview was profitable in every way because it gives all parties concerned a chance to exchange opinions that inspired the decisions taken. . . . There is room for cooperation between the paper industry and the government . . . a spirit of cooperation prevailed during this meeting."

Newsprint manufacturers said that they did not wish to comment at that time, but that they may do so at a later date. The meeting between the premier and the 11 producers was held in closed session.

The companies invited to participate in the conference to work out details of a special price consideration were: Canadian International Paper Co.; Consolidated Paper Corp. Ltd.; The James MacLaren Co. Ltd.; Abitibi Power & Paper Co. Ltd.; Howard Smith Paper Mills Ltd.; The E. B. Eddy Co. Ltd.; St. Raymond Paper Ltd.; Donnacona Paper Co. Ltd.; Anglo-Canadian Pulp & Paper Mills; Price Bros. & Co. Ltd., and St. Lawrence Paper Mills Co. Ltd.

U.S. price may go up

Early in February U.S. government officials told Congress that newsprint supplies for U.S. publishers will probably be more than adequate this year—but prices still may be boosted. DPA and NPA spokesmen reviewed the newsprint picture in an all-day hearing before the House commerce committee.

Asked whether prices may decline over the next five years, Richard B. Scudder, director of NPA's forest products division and publisher of the *Newark* (N.J.) *News*, said that they may well go up. Noting the possibility of a Canadian increase, Rep. Springer (R. Ill.) declared that he was unable to understand why Canadian prices are "so high, while cost of production there is relatively low."

Black-Clawson Names New General Manager

R. L. KUTTER, vice president of The Black-Clawson Co. and a former divisional sales manager, has been named general manager of the firm. He joined B-C in 1930, became assistant to the president in 1939, and in 1947 was elected vice president and sales manager of the Hamilton Division.

R. L. Kutter

S. T. Weber

A graduate of the University of Cincinnati, Mr. Kutter holds a B.S. degree in mechanical engineering and is a registered professional engineer. He is a member of the Superintendents Association and Tappi.

Shortly after his election, Mr. Kutter announced the appointment of *S. T. WEBER* as sales manager and *J. E. HARTFORD* as assistant general manager of the Hamilton Division. Mr. Weber was at one time with Oxford Miami Paper Co. and Gardner Board & Carton Co. Mr. Hartford was formerly with U. S. Gypsum Co. and Philip Carey Mfg. Co.

Grettum New Pusey & Jones President

LeROY A. GRETTUM has been elected president of Pusey & Jones Corp., Wilmington, Del. He succeeds Andrew G. Spiegelhalter, who has retired after 52 years' continuous service with the firm.

Mr. Grettum has been associated with Pusey & Jones since 1946, when he was named assistant to the president. He became vice president in charge of operations in 1948 and vice president and general manager in 1949. Last July, at the sudden illness of Mr. Spiegelhalter, he was made executive vice president and general manager.

A graduate electrical engineer, Mr.

TECHNICAL CONFERENCES for its representatives in the papermaking industry were held recently by A. E. Staley Mfg. Co., Decatur, Ill.; the men were guided through the firm's pilot plant, where they witnessed some of the experimental projects now being carried out by Staley; at the left, L. O. Carlisle and Robert Link watch the operation of an experimental cooker, while at the right a group gathers for an explanation of some new equipment; in charge of the program were W. A. Nielsen, supervisor of training; L. S. Roehm, corn division manager, and R. L. Nagle, industrial sales manager

Grettum was at one time president and chairman of the board of Eastern Oregon Light & Power Co. He is a member of the American Institute of Electrical Engineers, American Society of Mechanical Engineers, and a registered professional engineer.

L. A. Grettum

F. A. Soderberg

Soderberg Joins Huyck in Charge of Sales

FREDERIC A. SODERBERG has been appointed vice president of F. C. Huyck & Sons, Rensselaer, N.Y., in charge of sales for the paper-maker felts and mechanical fabrics division. Prior to his new position, he served as manager of the industrial division of General Dyestuff Corp.

A past chairman of the industrial affiliates of the Superintendents Association, Mr. Soderberg is currently chairman of the marketing and economics division of the American Chemical Society. He is also active in Tappi. He began his professional career—after graduation from the University of Maine—with International Paper Co.

Midwest Piping Votes Name Change

By a vote of stockholders at a recent meeting, the name of Midwest Piping & Supply Co. Inc. was changed to Midwest Piping Co. Inc. The firm is located in St. Louis.

A. G. Stoughton, president and chairman of the board, reported that there has been no change in ownership, management, personnel or activities of the company. "The name change," he said, "merely recognizes the fact that Midwest has grown away from the supply business. . . . For many years our major activity has been the fabrication and installation of piping and the manufacture of welding fittings."

Builders Iron Foundry Appoints Bradley

EARL H. BRADLEY has been elected president of Builders Iron Foundry, Providence, R.I. He succeeds Henry S. Chafee, who will remain as treasurer of the firm.

Mr. Bradley joined builders in 1934 and has served as shop superintendent, general superintendent, works manager, vice president, and executive vice president. He is also president of B-I-F Industries Inc., a director of Builders-Providence Inc., vice president of Proportioneers Inc., director of Omega Machine Co., director of Builders-Pacific Inc., president of B-I-F Industries of Canada Ltd., and vice president of Harris-Kinsley Inc.

$1,000 CHECK for the annual membership of Rust Engineering Co. in the University of Maine Pulp & Paper Foundation is presented by C. W. Churchill Jr. (left) to Ralph A. Wilkins; Mr. Wilkins, vice president of Bird & Son Inc., is chairman of the Foundation's finance committee

Kelsey heads Builders-Providence

Mr. Bradley as one of his first acts as president of Builders Iron Foundry announced that *GEORGE W. KELSEY* had been named president of Builders-Providence. BPI is the instrument division of Builders Iron Foundry.

E. H. Bradley

G. W. Kelsey

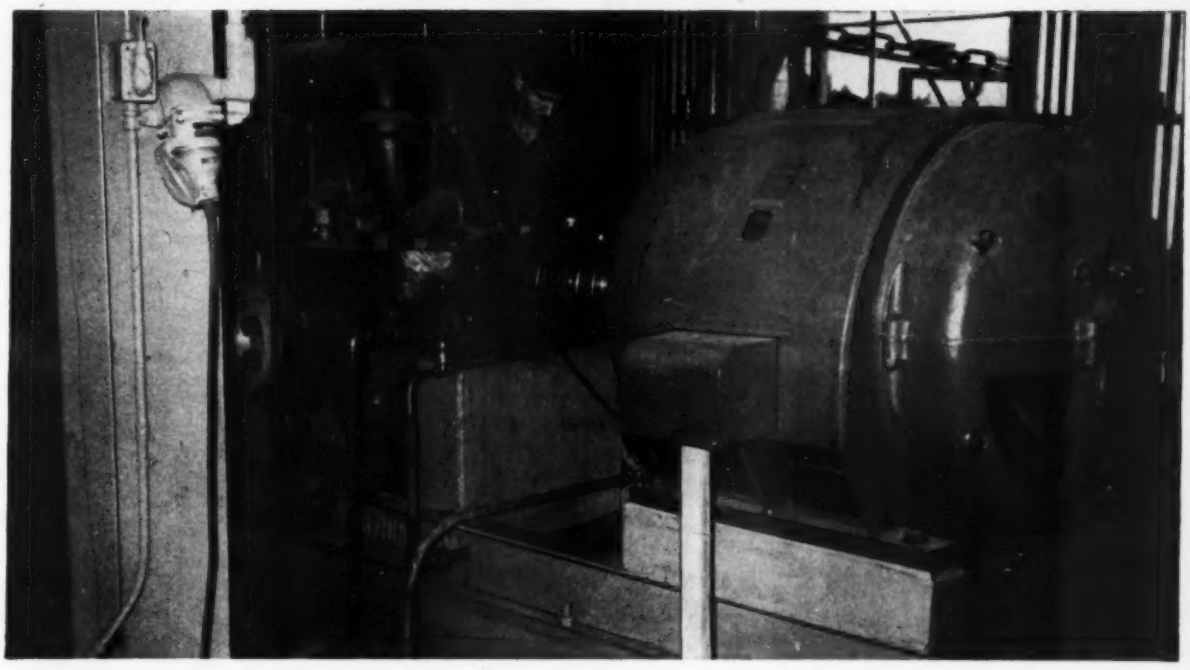
Mr. Kelsey came to Builders in 1938 from U. S. Steel Corp. He was at one time on the staff at Rutgers University as an associate professor and prior to that had been with Tide Water Oil Co. as an industrial engineer.

Allied Notes

Babcock & Wilcox Co.
has purchased a tract of land near Wilmington, N.C., and plans to construct a $2,000,000 plant for the manufacture of boilers and related equipment. This will be the second B&W plant in Wilmington and the fifth new plant to be added to the firm's boiler division in a little over a year. Operation is expected in June.

North American Philips Co. Inc.
will stage its 14th semi-annual X-ray Defraction School at the firm's application laboratory in Mount Vernon, N.Y., April 20-24. The sessions held last Oc-

35 Starts a Week!



J. B. Wilt, Manager of Spaulding Pulp and Paper Company of Newburg, Oregon, says: "We have found our 500 hp E-M Induction Motor equal to every demand placed upon it. It has been entirely satisfactory in performance and has handled capably the frequent starts to which it is normally subjected."

Spaulding's E-M 2-Pole Induction Motor WITHSTANDS SEVERE STARTING DUTY

What do you expect from high-speed motors? At Spaulding Pulp and Paper Company they expect plenty . . . and get it. Their 500 hp, E-M Heavy-Duty 2-Pole Induction Motor is making an average of *35 starts a week* driving a hydraulic barker pump. This is a grueling test of good 2-pole motor construction . . . the powerful magnetic forces due to starting current inrush put a tremendous strain on the motor.

Tough starting is not the only difficult service. E-M motors can be built with the extra capacity needed to withstand unusual load conditions, high ambient temperatures, high peak loads, or special atmospheric conditions which it may encounter.

Day-in, day-out, this 3580 rpm motor at Spaulding is giving smooth, cool running service. This barker pump motor is an example of exacting pump, blower, and compressor duty, on which E-M motors give top performance. And this is the kind of service E-M can give *you*—Contact your nearest E-M Field Engineer for details—he's an experienced Engineer who can give you competent advice and application information on all types of drives.

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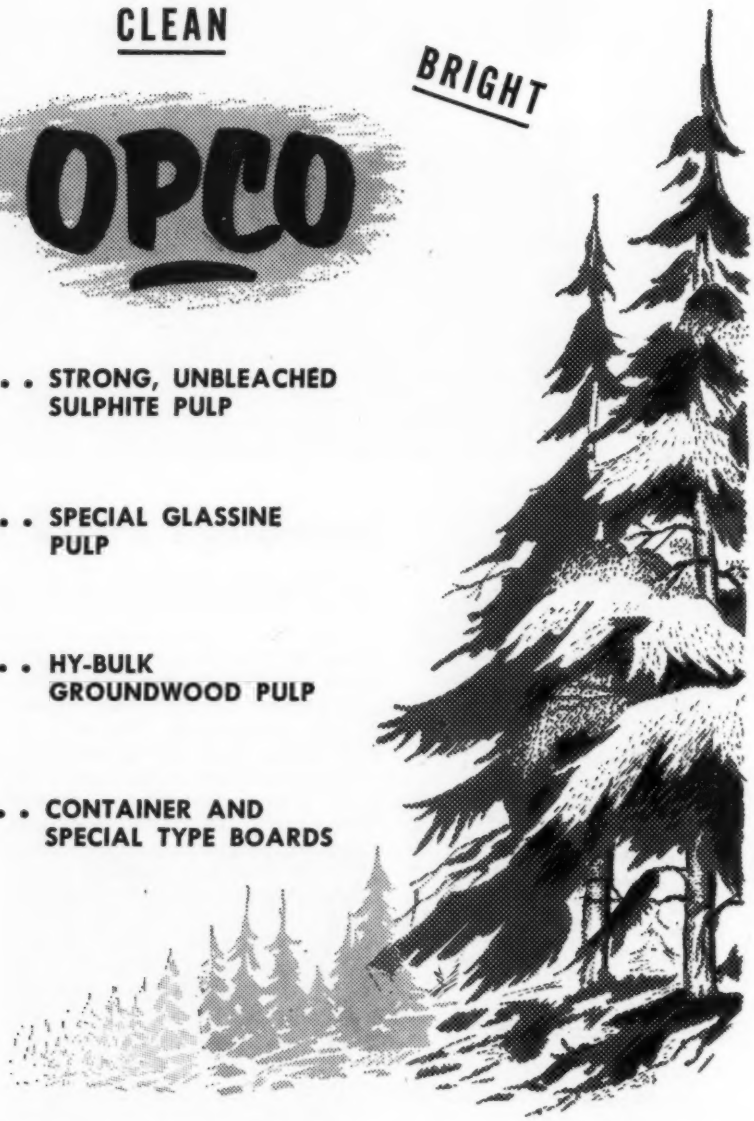
OPCO . . . CONTAINER AND SPECIAL TYPE BOARDS



INQUIRIES INVITED

THE **ONTARIO PAPER CO.** LIMITED

THOROLD • ONTARIO • CANADA

tober were attended by 147 scientists from throughout the United States and Canada.

Oliver United Filters Inc.
has arranged for local sales and engineering representation in southern California, Arizona, Nevada, and New Mexico. R. M. Stampley, formerly with the Oakland office, will be in charge of the branch, which is to be located in Los Angeles.

Beloit Iron Works,
Beloit, Wis., has announced that permanent arrangements for exclusive agency representation in Argentina and Uruguay have been made with Juan Swoboda Inc., Buenos Aires. Swoboda also has an office in New York, N.Y., under the direction of Mrs. V. Laqueur.

Hammel-Dahl Co.,
Providence, R.I., manufacturer of automatic control equipment, has appointed two new sales and service representatives: Control Equipment Co., Atlanta, and James E. Dyer Co., Tulsa and Oklahoma City.

Kidder Press Co.
of Dover, N.H., has announced the appointment of Gibbs-Brower Co. Inc. of New York, N.Y., as representatives for Kidder slitters and winders in the paper mill field.

Barco Mfg. Co.
of Chicago announced in March that all of its manufacturing and business operations were being transferred to Barrington, Ill., where a 103,000-sq. ft. plant has been constructed.

Reichhold Chemicals Inc.
has opened new office and laboratory quarters at its plant in South San Francisco, Cal. The new unit makes a complete line of synthetics for the surface coatings industry, as well as bonding and laminating resins.

Leeds & Northrup Co.
has moved its Philadelphia district sales office to new and larger quarters at 444 North 16th St.

Reichhold Chemicals Inc.
has announced plans to manufacture and market powdered phenolics for a wide variety of industrial applications, including wood waste products. An annual 60,000,000 pounds will be produced at Tuscaloosa, Ala.

American Cyanamid Co.'s
Calco Chemical Division has moved the Boston sales office, laboratories and warehouse of its Dyestuff Department to 1055 Commercial Ave., headquarters for northern New England personnel.

J. V. Eakin Clement Reeves K. R. Spelman J. S. Walsh W. A. Franck

Fawick Airflex Announces Five Executive Appointments

R. S. Huxtable, president of Federal Fawick Corp., has announced five new executive appointments in the Fawick Airflex Division. Fawick Airflex, located in Cleveland, manufactures industrial clutches and brakes.

JOHN V. EAKIN, who has been with the firm since 1943, has been made assistant general manager. He was formerly sales manager. Succeeding Mr. Eakin as sales manager is *CLEMENT REEVES*, who has been in charge of sales to manufacturers of earth-moving and construction equipment.

Working with Mr. Reeves will be *K. R. SPELMAN*, who becomes assistant sales manager. He has been a sales engineer since he joined the firm in 1945.

J. S. WALSH, formerly chief engineer, becomes director of engineering and service. *W. A. FRANCK*, who was design and development engineer and with the company since 1943, now becomes chief engineer.

Allied Personalities

E. P. ROUDEBUSH has been promoted to the post of vice president and works manager of the Roots-Connersville Blower Division of Dresser Industries Inc. He will be in charge of manufacturing at the Connersville, Ind., and Delaware, Ohio, plants. Mr. Roudebush came to Roots-Connersville in 1950 as assistant to the vice-president in charge of manufacturing.

A. L. DANIELSON has been made manager of the Denver branch office of Bailey Meter Co. He will supervise the sales and service of automatic steam plant and process control equipment in Colorado, Wyoming, Utah, New Mexico, and the Texas panhandle.

JAMES S. WALKER has been named manager of technical service of Hooker Electrochemical Co. He has been with the firm since 1940 and technical service supervisor since 1950.

HAROLD T. ZANDERS has been named sales engineer for Warren M. Wilson Co., Cleveland representative for Conoflow Corp.

L. C. REID has been made manager of the western district (16 states) of the Michigan Alkali Division of Wyandotte Chemicals Corp.

G. M. WALLACE, manager of Bailey Meter Co.'s Denver district, has been appointed an assistant sales manager with headquarters in Cleveland.

A. L. Danielson

L. P. Mellgren

LEONARD P. MELLGREN has been appointed a district sales engineer for De Laval Steam Turbine Co. He will head the firm's new district offices in Minneapolis. Mr. Mellgren will be responsible for both the sales and application engineering of De Laval products in a territory consisting of Minnesota, North Dakota, South Dakota, and adjoining sections of Wisconsin that include Ashland and LaCrosse.

G. M. Wallace

Hugh Puckett

HUGH PUCKETT, formerly the southern district manager of the Industrial Chemicals Division, has been named manager of the Specialty Products Department of American Cyanamid Co. He is a member of Tappi.

LOUIS ALLIS JR., formerly vice president in charge of sales, has been elected vice president of The Louis Allis Co. He joins with his brother in

Louis Allis Jr.

C. G. Skidmore

J. F. Shea

F. N. C. Jerauld

the active management of the firm. *C. G. SKIDMORE,* formerly sales manager, was elected vice president in charge of sales.

FORREST C. AMES has been appointed sales manager for Mount Hope Machinery Co., Taunton, Mass. He was at one time chief engineer of Rodney Hunt Machine Co.

JAMES M. WHITE has been elected vice president in charge of manufacturing for American Car & Foundry Co. He succeeds Robert W. Ward, who has retired after 42 years' service.

D. W. FORBES of Dallas has been elected president of Pan American Sulphur Co. to succeed J. R. Parten, who becomes chairman of the board.

JOHN F. SHEA, formerly northeastern district sales manager, has been appointed general sales manager of Buffalo Electro-Chemical Co. *FRED N. C. JERAULD,* formerly assistant to the president, has been made manager of sales promotion.

ALAN H. HARRIS has been appointed products manager of the Phosphate Coating Division of Detrex Corp., Detroit. He will be in charge of the application of all Detrex phosphate coating materials.

ELMER F. HINNER, general manager of the Virginia Cellulose Department, and *PAUL MAYFIELD,* general manager of the Naval Stores Department, have been elected directors of Hercules Powder Co., Wilmington, Del.

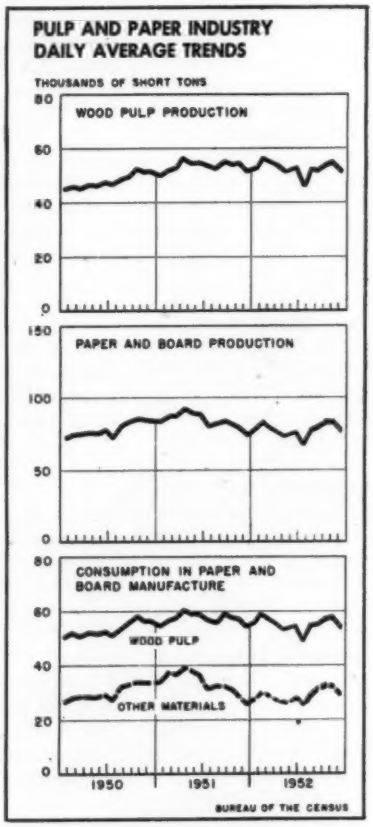
U. S. Paper and Paperboard Production

	Dec. 1952 (tons)	Nov. 1952 (tons)	Dec. 1951 (tons)	Total 1952* (1,000 tons)	Total 1947 (1,000 tons)
Paper and Board, total	2,024,054	2,103,797	1,846,594	24,413	21,102
Paper, total	886,116	885,555	951,131	10,896	10,693
Newsprint	88,492	85,956	89,883	1,106	833
Groundwood paper (uncoated)	60,909	65,017	70,252	809	821
Printing and converting (coated)	95,251	86,757	91,585	1,096	
Book paper (uncoated)	128,487	125,598	129,914	1,482	2,208
Fine paper (writing, cover and text, bristols, thin paper and other)	95,799	98,393	118,200	1,295	1,172
Coarse paper (unbleached, kraft, glassine, greaseproof, vegetable parchment, and other)	256,330	269,137	305,214	3,235	2,903
Special industrial paper	34,656	30,666	33,645	396	289
Sanitary paper	96,189	96,214	88,688	1,148	894
Tissue paper	18,054	18,062	15,922	209	195
Absorbent paper	11,949	9,755	7,828	118	100
Paperboard, total	928,593	985,750	734,067	10,776	9,187
Containerboard, total	509,315	536,549	406,775	5,770	4,943
Liners	340,874	364,613	271,378	3,905	3,293
Corrugating material	144,429	147,010	116,334	1,583	1,370
Container chip	24,012	24,926	19,063	282	280
Bending board (folding boxboard)	260,696	279,428	206,615	2,194	2,249
Non-bending board (set-up boxboard)	64,967	74,367	46,862	687	595
Cardboard	4,842	6,207	5,289	69	92
All other paperboard	88,773	89,199	68,526	2,056	1,307
Wet machine board	12,175	11,505	9,189	137	150
Construction paper and board, total	197,170	220,987	152,207	2,603	2,349
Building paper and insulation	87,410	106,059	70,663	1,298	1,277
Hardboard and insulating board	109,760	114,928	81,544	1,305	1,072

(*) Preliminary report. *Source: U.S. Department of Commerce.*

December Pulp, Paper and Board Production

Paper and board production during December amounted to 2,024,054 tons, according to a report released by the Bureau of the Census. This is an approximate 10 per cent increase over the 1,846,594 tons produced in December 1951. In terms of production base capacity, the industry operated at 71.8 per cent in December, with the paper and paperboard sections operating at 76 and 70.1 per cent, respectively. The comparable ratios for November were: Total, 77.8 per cent; paper, 79 per cent, and paperboard, 77.5 per cent.



Pulpwood receipts at the pulp mills during December amounted to 2,270,460 cords, with consumption at 2,135,386 cords. Month-end inventories increased slightly to 5,948,836 cords.

Wood pulp production during the month amounted to 1,346,709 tons. In terms of production base capacity, pulp production ran at 77.7 per cent, as compared to 83.4 per cent in November.

Wood pulp inventories at the end of December at the paper and board mills were 567,531 tons, as compared to 528,712 tons reported at the end of November. Month-end stocks at the pulp mills amounted to 143,438 tons, remaining at about the November level.

No birds' eyes in your rag bond when it's made with

ARMOUR CHROME HIDE GLUE!

New drying methods insure that Armour's new "gelatine" type clear chrome hide glue is free from foreign materials. This improved product contains no free grease to cause "birds' eyes" in rag bond sized with it. Armour clear chrome hide glue produces a strong, colorless protective film that improves firmness, strength, rattle, resistance to tear, erasing and folding, and prevention of feathering. Due to the fineness and uniformity of particle size, it is readily soluble. It is slightly alkaline, with a pH range of from 7.2 to 7.8.

Armour standard clear hide glue—for the same field—has a pH range of 6.8 to 7.0. Surface sizing with this fine glue makes blue print, map, chart and similar papers compatible to treatment with tanning agents.

In other fields, there are exceptional Armour adhesives, such as our special hide glue for use as a colloidal flocculant for the retention of fiber and filler. We have other glues for "on machine" creping directly from the Yankee Dryer that contribute the tacking properties necessary for softness in paper tissues. Write today for complete information and prices on Armour glues for paper making.

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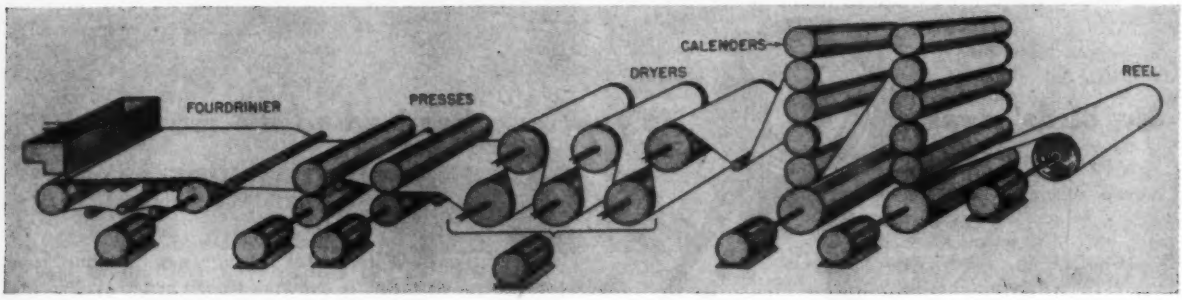
50 Farnsworth Street, Boston 10, Massachusetts
120 Broadway, New York 5, New York



Magnetic amplifiers in paper mill controls

M. H. FISHER*

IN THE PAPER INDUSTRY, as in most continuous process industries, speed is an economic necessity. But speed alone is not sufficient — it must be achieved at no sacrifice in quality. Thus the faster the process, the more accurate must be the regulators. Regulators recently developed to achieve these goals are of the magnetic type—rotating regulators and magnetic amplifiers. These regulators require less maintenance for long and dependable service.

The various phases of papermaking each have their own special conditions and requirements. New methods and systems now being applied to the most difficult control problems — the paper machine itself, its reel drive, the supercalenders, and winder drives — are outstanding examples of the precision and speed that can be obtained.

The paper machine

The paper machine (Fig. 1) perhaps offers the most complex use of regulators. As paper mills grow larger and more complicated, the paper machine sectional electric drive, i.e. one in which each section has its own drive motors, has increased advantages. The power that can be used to drive a section is unlimited; also, the ease of control and flexibility is the same regardless of rating.

Increased speed and horsepower cause the regulator requirements for an electric sectional drive to become more exacting, since the machine friction load and inertia for different sections vary over a wide range. For example, in a modern high-speed drive, a couch section having almost a 100 per cent friction load would have a 500 hp drive motor, while the dryer section with its tremendous connected inertia load would have a 150 hp drive motor.

Two methods have been used for regulating paper machine sections—one based on the section's absolute speed and the other on its position relative to other sections. The absolute-speed method utilizes a tachometer to measure the speed of the section. The output voltage of the tachometer, which is proportional to speed, is compared to a master voltage reference. The electronic paper machine sectional regulator is of this type.

The most recent sectional regulator uses the position principle in combination with a quick-acting, speed-responsive element and a magnetic-amplifier

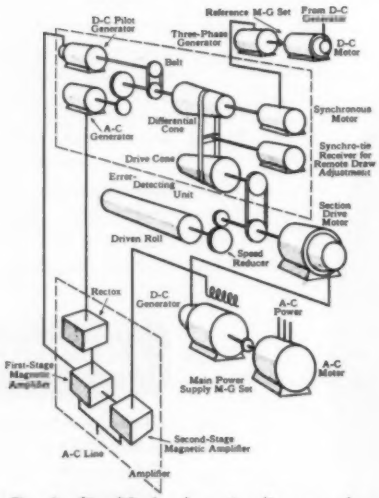


Fig. 2—Simplified schematic diagram of a differential regulator

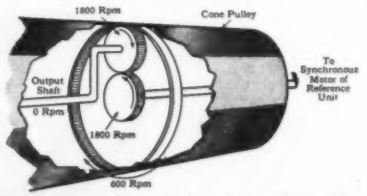


Fig. 3—A cutaway sketch of the differential cone

(Fig. 2). The main components of the regulator are: (1) An error-detecting unit, located adjacent to the regulated section motor, and (2) a magnetic amplifier and control unit that is part of the main dc control panel for the drive. The error-detecting unit consists of a set of cone pulleys that are driven from the regulated section; a reference, which is a synchronous motor driven at a speed proportional to a master-set speed; a differential gear system for detecting any error between the cone-pulley speed and synchronous-motor speed, and output units that produce electrical signals proportional to the position of the differential output shaft and to its rate of change of position. The error-detecting unit also contains a Synchro-tie receiver to position the cone pulley belt for remote draw adjustment.

The control unit contains two magnetic amplifiers, a first-stage unit for amplifying the electrical signals from the error-detecting unit, and a second-stage for furnishing controlled excitation to the shunt field of the regulated generator (or motor in the case of a single generator drive). The control also includes damping and control transformers, Rectox rectifiers, and the necessary calibrating resistors.

In the error-detecting unit, a cone pulley is either chained or belted to the regulated section. This cone pulley drives a second cone pulley through a belt. Inside the second pulley is a planetary gearing system that constitutes a mechanical differential (Fig. 3). One portion of this differential consists of a ring gear on the inner surface of the second cone pulley. The other half of the differential is mounted on a shaft that extends inside the pulley. This shaft is driven by a small synchronous motor that receives power from a master frequency set, which serves as a speed reference for the entire machine.

The output shaft of the differential is mechanically connected to a small ac in-

*Manager, general mill section of the Industry Engineering Department, Westinghouse Electric Corp., East Pittsburgh, Pa.

duction generator and a small dc generator. The ac generator is similar to an induction regulator in that it has a standstill output voltage that is determined by its rotor position. When the second cone pulley and the synchronous motor rotate so that both halves of the differential are at the same speed, the output shaft is at standstill; consequently, so are the small ac and dc generators. The standstill output of the ac generator is rectified and fed into the magnetic amplifier and fixes the steady-state field excitation of the regulated generator. Normally, the output of the small dc generator is also fed into the magnetic amplifier; however, its output voltage is zero at standstill.

Should an error develop in the speed relationship between the second cone pulley and the synchronous motor, the output shaft of the differential rotates. Thus the output voltage of the ac induction generator changes in accordance with the change in its rotor position. The dc generator now has an output voltage the magnitude of which is determined by the speed at which the differential output shaft moves. This change in output of both the ac induction generator and the dc generator causes a corresponding change in the excitation of the regulated generator, thus bringing the motor speed back to its original value. Voltage amplification in the dc generator circuit is relatively high as compared to that in the ac generator circuit, assuring quick correction and restoration of speed to its original value.

A set of stops and a small slip clutch are mounted on the rotor shaft of the ac induction generator to limit the rotor travel to about 55 electrical degrees for the regulating range. This makes the output of the ac induction generator nearly linear with position (Fig. 4).

The ac induction generator and the dc generator are in motion only during the correction period. Under steady-state conditions, the only moving elements of the regulator are the cone pulleys and the synchronous motor.

Draw adjustment is accomplished by adjusting the position of the belt that connects the two cone pulleys. This belt can be positioned locally by means of an operating handle on the error-detecting unit, or remotely by means of a Synchrotie system. Slack takeup is accomplished by means of a push button-operated magnet coil that permits a momentary shift of the cone pulley belt. This permits taking up the slack in the sheet between two sections without disturbing the draw adjustment of the regulator.

Paper machine core-type reel drive

At the extreme dry end of the paper machine, the paper is wound on a reel. Certain machines use reels driven at the

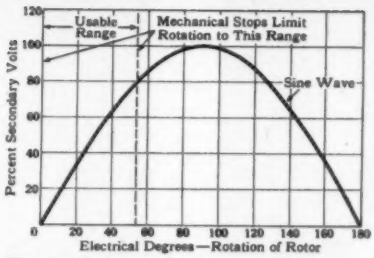


Fig. 4—Variation of the a-c generator output with position

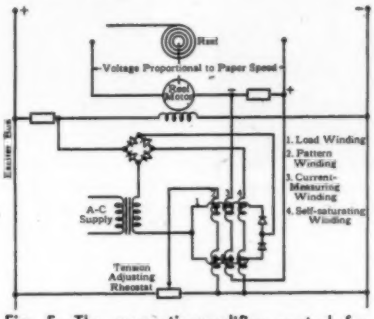


Fig. 5—The magnetic-amplifier control for reel tension

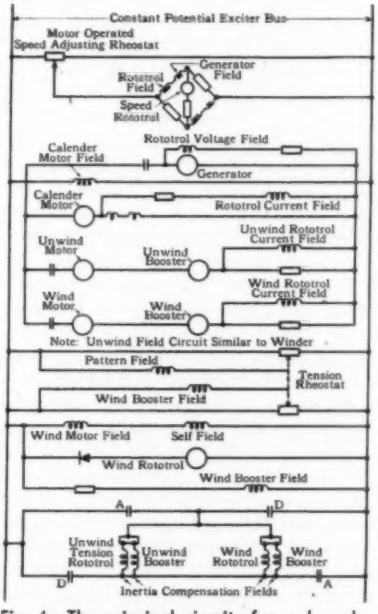


Fig. 6—The principal circuits for a d-c adjustable-speed supercalender drive

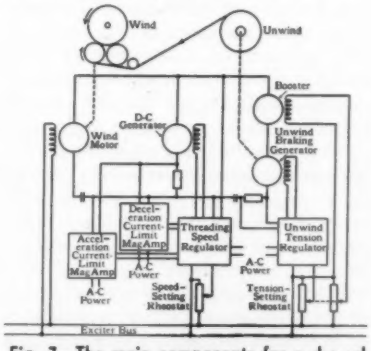


Fig. 7—The main components for a d-c adjustable-voltage winder drive with electric braking

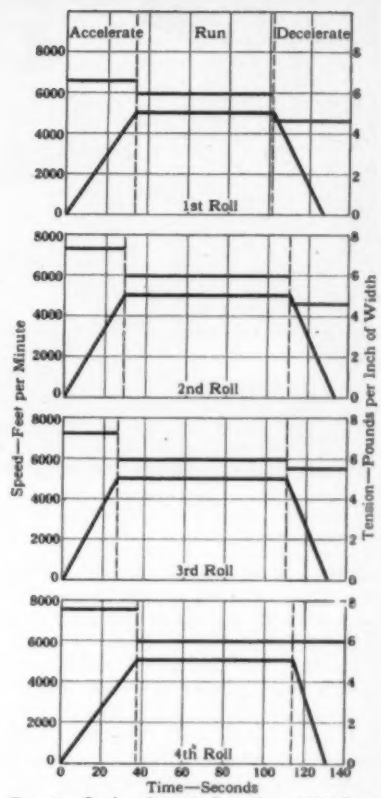


Fig. 8—Cycles for winding four 9000-foot rolls of 0.0126-inch-thick paper

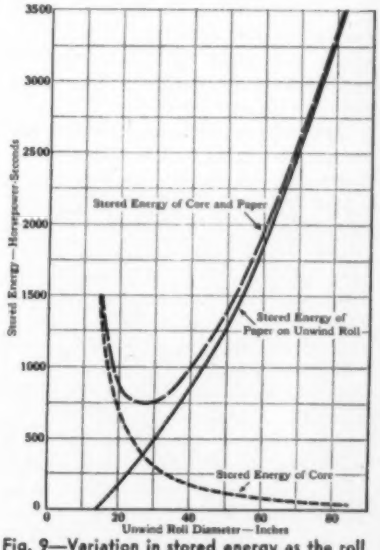

Stored Energy of Core and Paper
Stored Energy of Paper on Unwind Roll
Stored Energy of Core
Stored Energy—Horsepower Seconds
Unwind Roll Diameter—Inches

Fig. 9—Variation in stored energy as the roll is paid out

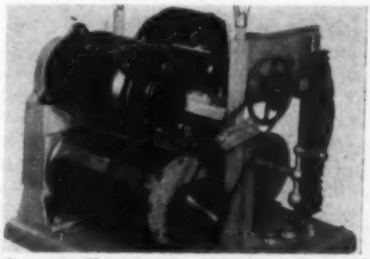


Fig. 10—The elements of the differential regulator

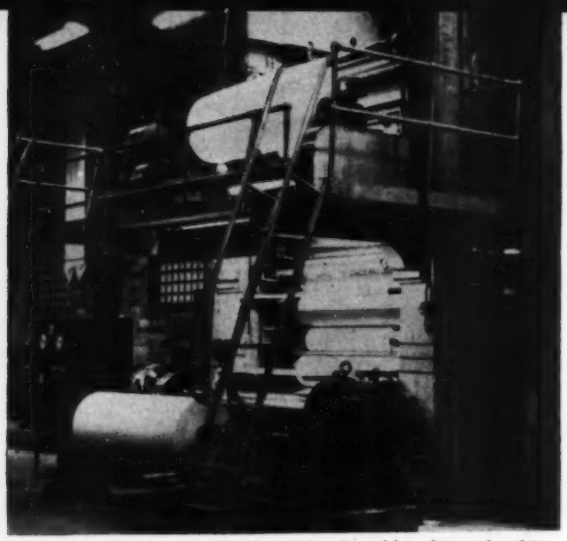


Fig. 11—A 76-inch supercalender with adjustable-voltage d-c drive. Its operating speed is from 50 to 1800 rpm, with Rototrol regulator threading-speed control

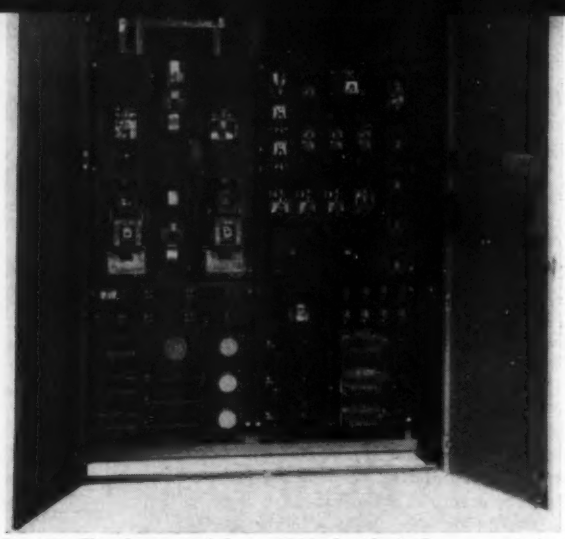


Fig. 12—The d-c control for a 238-inch-wide kraft paper winder. Magnetic amplifier panels are at bottom, threading-speed regulator at left and unwind tension regulator at right

center or core, and such a reel requires a regulator to hold constant paper tension while the reel builds up from empty core diameter to full-reel diameter (Fig. 5). The reel motor receives its power from a generator whose output voltage is approximately proportional to the speed of the paper. The reel motor shunt field is excited from two sources —the constant-potential exciter bus through a series resistor, which sets minimum field of the motor to prevent loss of this field, and a magnetic amplifier, which can strengthen, but not decrease, the motor field. This regulator holds essentially constant tension in the paper as the reel builds up.

The magnetic-amplifier constant tension regulator has four windings as follows: (1) An ac winding that can be connected in the conventional doubler circuit; (2) a pattern-field winding, whose strength is adjustable over a range proportional to the desired tension range over which the reel must operate; (3) the current-measuring field winding, which measures the current in the reel motor armature circuit, and (4) a positive feedback winding, which allows increased amplification.

The function of the pattern and current-measuring fields is to hold reel-motor armature current constant as the reel diameter increases from empty core to full roll. Since the regulator works on the motor field, this is a constant-horsepower regulator.

A 164-inch-wide paper machine making saturating pulp (cellulose pulp used in making rayon) at a maximum speed of 300 fpm would require a 15 hp reel drive motor to hold a maximum of 6 pounds-per-inch of width tension in a sheet of paper as it is wound on a reel with a 16-inch core diameter and a maximum build-up of 84 in. The reel drive motor would operate over a speed range of 380 to 2000 rpm through a 28:1 ratio speed reducer.

Supercalenders

After certain papers, such as book, writing and glassine, leave the paper machine, they are taken to a supercalender to be given a hard surface. The supercalender is not a continuous process machine. Since it is idle for a minimum of 30 per cent of the time for threading and splicing of sheets, the supercalender must be operated at the fastest permissible speed to make up for the time lost. As the speeds of the paper machines increase, the speeds of the supercalenders tend to follow; for example, the maximum speed of supercalenders in 1930 was 1,200 fpm; by 1940 the speed had increased to 1,500 fpm, and today 2,000 fpm is becoming quite common. With all of this increase in operating speed, the threading speed has remained at 50 fpm because the operator cannot conveniently handle the process at any higher speed.

The rolls in the supercalender are made of steel and a soft material, such as paper or cotton. The hard and soft rolls are arranged alternately in the stack. A tremendous pressure—as high as 2,000 pounds per inch of width—is applied to these rolls. Slippage of the rolls on the paper at the roll contact points results in an ironing process. Application of this pressure on the rolls causes the calender load to increase from about 10 per cent to 100 per cent of the rated value. Unless the pressure can be applied at the threading speed and the calender accelerated with pressure on, then the paper processed during the accelerating and decelerating periods must be scrapped. On a 2,000 fpm calender this means that 350 ft. of scrap paper would be made during each acceleration or deceleration period.

The modern supercalender drive (Fig. 6) utilizes a Rototrol regulator to provide threading-speed regulation. This regulator allows the supercalender to be threaded at as low as 1/40th of the top operating speed, and 100-per cent load can be applied at this low speed without noticeable change in paper speed.

The supercalendering process requires that the paper be unwound at the entry end and rewound at the delivery end using core-type reels. Electrically powered reels have proved the most satisfactory and the most economical on a power consumption basis. The reels are regulated by a combination of boosters and Rototrol regulators to provide constant tension in the sheet at threading speed, during acceleration and at any operating speed. The constant-tension reel regulators operate on the general principle previously explained for the center-wind reel at the dry end of paper machine. Inertia compensation on the reel drive during acceleration and deceleration period is relatively easy to accomplish by recalibration of the unwind and wind tensions during each rate of change period. Since the supercalender requires a relatively long period for acceleration (about 20 seconds), a motor-operated rheostat is used to achieve a constant rate of acceleration, and inertia-compensation relays simply recalibrate the tension during this period.

In addition to holding tension, the unwind reel is arranged to pay out paper while the supercalender is at standstill. The wind reel is arranged to operate at a peripheral speed slightly above the linear speed of the paper during the threading period. This allows the operator to get a tight initial wrap on the reel drum. Tension under stall condition is provided to allow the operator to splice the sheet to remove defective portions of the paper.

A 156-inch-wide supercalender finishing book paper at 2,000 fpm might require a 400 hp main drive motor. To hold tensions of four pounds per inch of width at the unwind reel and three pounds per inch of width at the wind reel, 40 hp reel motors would be re-

quired. A combination of Rototrol speed regulators on the supercalender stack and Rototrol tension regulators on the reels enables the papermaker to put uniform, top quality finishes on the paper at maximum rates.

The winder

Following the papermaking machine or the supercalender, the paper is finally trimmed and wound into rolls of suitable size and weight for shipping. The winder is a start-stop process that must operate at a minimum speed of at least twice the maximum speed of the papermaking machine, since only one winder is usually provided for a given machine. A winder for kraft board may be operated at 5000 fpm. Huge 84-inch-diameter, 234-inch-wide rolls, weighing as much as 35,000 pounds, are rewound into shipping rolls 42 in. in diameter and 78 in. wide. A 400 hp winder-drive motor, a 187 kw unwind braking generator, and a 200 kw power supply generator—all capable of handling 200 per cent load during speed-change periods—are required to achieve reasonable production cycles.

The winder-drive motor is a constant-speed dc motor that powers the surface wind drums, and the unwind braking generator is an adjustable-speed dc machine connected to a core-type unwind stand (Fig. 7). After the drive is up to operating speed, the winder-drive motor runs at constant speed as the shipping roll builds up; the unwind braking generator, however, operates over a speed range depending on the change in diameter of the unwind roll. Tension in the paper is determined by the value of armature current in the braking generator. Speed of the paper is set by the speed of the winder motor, which in turn is related to the generator armature voltage. During the accelerating period, the tension in the paper depends not only on the armature current of the braking generator but also on the torque necessary to accelerate the unwind roll and braking generator. Thus, to maintain the desired tension, the armature current of the braking generator must be reduced during the accelerating period and increased during the decelerating period; this is called inertia compensation. When a motor-operated rheostat is used to accelerate and decelerate at a constant rate of change of speed, inertia compensation is relatively easy. On large winders where maximum performance of the winder is necessary, the maximum rate of change is limited only by the overload capacity of the electrical equipment. Thus, on large winders, current-limit magnetic amplifiers are used to set the rate of change of speed, and the problem of inertia compensation becomes more complicated. Typical winding cycles are shown in Fig. 8.

The stored energy in the unwind roll decreases drastically as the roll is paid out (Fig. 9). The stored energy in the whole winder system including the unwind roll also changes, affecting the time required to accelerate and decelerate. The two changes in stored energy have a compensating effect, making a constant preadjusted amount of inertia compensation satisfactory. Relays that sense the change in the speed indicated by movement of the speed-adjusting rheostat are used for initiating inertia compensation; these relays remain actuated as long as the drive speed is being changed. Additional relays are used to recalibrate the value of current that the tension regulator holds during the accelerating and decelerating period, according to the diameter of the unwind reel.

The papermaking process is a continuous one, often operating seven days a week. Down-time is expensive, so precision regulation with an eye to minimum maintenance and continuity of service is important. These regulating systems help the papermaking industry to achieve optimum performance.

Correct choice of instruments in pulp and paper manufacture

LEO WALTER*

THE QUESTION whether instrumentation is necessary in manufacture of pulp and paper has long been answered in the affirmative.

The problem today centers on the correct choice of an instrument type, and on its most convenient installation method. Vigorous developments in instrument design, especially of new electronic types with smaller time lags, coupled with greater accuracy of measurement and control have produced a great variety of designs now available to the instrument engineer and to the pulp and papermaker, but a sometimes bewildering number of instrument types using similar or different methods for solving the same problem makes selection difficult. Some problems, such as measurement of black liquor, surface temperature control of drying cylinders, or measurement of bleach liquor preparation can be tackled in various ways, and naturally each instrument maker claims that his method is best. The snag is, however, that one automatic control method and make of instruments might work to fullest satisfaction in one mill, but when installed in another plant, the same control system might cause endless trouble. The reasons for these happenings are manifold, and will be dealt with later in this survey, but the fact is well-known, and often puts plant management in a dilemma.

For example, one company had considerable trouble in several of its paper mills, working with the same make of paper machine under apparently similar conditions, with the simple job of steam reduction for the drying section of a fourdrinier machine which had been satisfactorily solved with the same type of steam pressure regulators in several other mills belonging to the same company. Although all mills used the same type of papermaking machine, there was just one little but decisive difference between the two groups of mills, namely the method of condensate drainage used

Servicing electronic recorder-controllers from back of instrument cubicle

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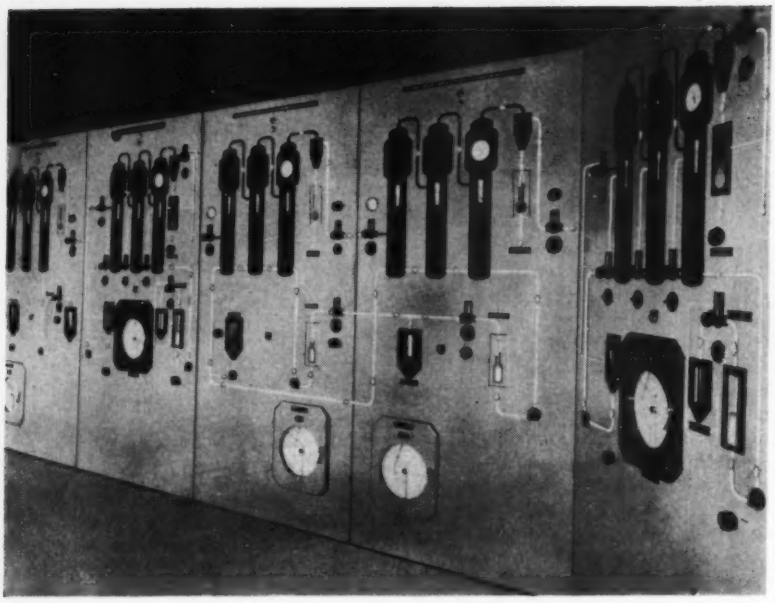

Graphic panel for controlling triple effect evaporators

in the drying section. Where the correct method of steam trapping and air venting of the cylinders was used, steam pressure control worked well due to absence of waterlogging and of air and gases in the cylinders. On the other hand, where cylinder drainage and air venting were faulty due to use of the wrong steam trap types, and of group trapping, the pressure control suffered, and so did cylinder surface temperature. The remedy lay in improving something which at a superficial glance was not directly connected with instrumentation and pressure control at all, namely efficient condensate removal.

Progress in processing instruments can be summarized in terms of reliability, speed of response, and accuracy. Most of the recent developments have been made possible by the use of electronic valves for instrument mechanisms which have almost eliminated instrument time lags. The success of electronic instruments is based on powerful amplification of any detecting electrical impulse, derived from change of temperature, pressure, rate of flow, liquor acidity, density, liquid level, etc. Electronic tubes are also applied in ever-increasing numbers in modern automatic control instruments, where swiftness of counteracting even a slight process disturbance is important, such as increase of pH in a process mixing two liquids, or change of density, etc.

For temperature, the application of modern sensitive electrical resistance thermometers or of responsive thermocouples with electronic indicators or recorders is the obvious solution for quick measurement and automatic control in continuous processing.

Hydrogen-ion concentration (pH) measurement

The measurement of pH in the laboratory is not new, but plant instruments for continuous use have only been developed in recent years. In certain chemical and food processing methods, the measurement of acidity is often of great importance. The range of pH, the factor by which acidity is measured is from − 0.3 to + 14.5. Industrial types of instruments using electrodes for continuous pH measurement have been developed, and indicating, recording, and controlling pH meters are now being made for practical use in the paper mill for processing purposes. Their use for controlling plant effluents, boiler feed water, etc., is also increasing. The usual pH meters are either electrically or electronically operated indicators, or sometimes roll chart recorders, the latter being capable of recording acidity or alkalinity over a period up to one month on a single strip chart.

Specific gravity and density

The usual method of detecting a change in liquid density is to immerse in the vessel a dip tube through which passes compressed air at constant low pressure so that it escapes from the lower end. The tube is thus kept filled with air and the air pressure is proportional to height and density of the liquid column, so a suitable calibration of a pressure indicating or recording instrument gives the required information.

This continuous method has replaced, in many instances, the use of glass hydrometers. Sometimes two standpipes are used, and the weight of the liquid column between their respective dip ends is shown on a dial instrument or on a recorder calibrated in units of specific gravity.

Tank depth and liquid level measurement

Considerable improvement over the old float and cable method has been made in the indicating or recording of liquid depth tanks, or of closed pressure vessels. Measurement of liquid level in closed vessels can be done by a U-tube manometer with electrodes inserted in a measuring container so that the varying electrical resistance moves the indicator pointer. Float type indicators with seals are also well known, having a float in the tank and an indicating scale on the instrument dial outside the vessel, sometimes using an external float chamber connected in the pressure vessel by short pieces of pipe.

Pneumatic level gauges can be of the intermittent or of continuous types when using the air bubble principle. A diving bell with hand pump for admixture of air is used for periodical indication or recording liquid level (telemetering) by using pneumatic or electric transmitters (senders), which operate remote receivers such as in pumping stations or waterworks, or in more elaborate manufacturing processes where a central panel shows all measurements on remote instruments from the various measuring points.

Conductivity measurement

Instruments have recently been developed for measuring the electrical conductivity in water or aqueous solutions continuously. Purity of water or condensate is often of importance and then the concentration of dissolved electrolytes can be used as a measure.

Modern telemetering

In order to transmit a measured value from the point of measurement to a remotely installed receiving instrument, which may be on a central instrument panel or in the plant engineer's office, pneumatic or electric telemetering methods are coming extensively into use. Remote indication or recording of temperature, pressure, liquid level, bin level, vacuum, rate of flow, etc., has greatly facilitated the installation of central instrument panels. When single-pen or multi-pen recorders are used on the control panel, a glance reveals the progress in processing at any time from the record charts.

The method in some processing plants is to install an indicating transmitter at the plant operator's place, and to assemble the secondary instrument or receiver in the form of a recorder on a central instrument panel. This arrangement places the main responsibility on

the man who watches progress in processing on the record charts on the panel, and leaves the plant operator rather in the dark as to what is happening. To reverse the layout and to give the plant operator the recorder-transmitter and place only an indicating receiver on the control instrument panel makes the latter less valuable because it shows instantaneous values but not the progress. In general, it seems that the indicating transmitter and the recording receiver are the preferable solution, especially if the plant operator is within easy reach of the chart records.

Measurement and automatic control

Every measuring problem is solvable by producing movement of an indicating or recording unit. For example, a process temperature can be measured by using either expansion or contraction of a liquid or of a solid substance, or by producing gas pressure in a vaporizing liquid. Temperature can also be measured by utilizing the physical fact that electrical resistance of a special wire changes with temperature. The mechanical or electrical changes produced with measurement move a pointer on a scale or a pen on a record chart. Similarly, pressure can be measured by deflection of a flat membrane or of a corrugated metallic bellows or of a Bourdon tube element. It can also be measured in a manometer by displacement of a liquid or mercury column. Movement for measurement of liquid level is produced by a float riding on the liquid surface, or in depth gauges by utilizing the pressure of a liquid column. Density of a liquid is measured with hygrometers by variation of immersion depth of a hollow body.

Automatic control then adds a controlling mechanism to the above measuring elements. Automatic regulators can be very simple, such as thermostatic switches, or they can be very elaborate, such as stabilized pneumatic or electronic controllers for chemical reactions. The reason why automatic control instruments are more complicated than measuring instruments is that measurement of a process factor establishes a fact, but automatic control has to make certain conclusions from the result of measurement. The user of an automatic regulator wishes to establish a "desired value" of a process factor; for example, he pre-sets a certain steam pressure on a reducing valve, or a temperature on a thermostat, and expects the control mechanism to hold it there without fail.

Factors in instrument choice

The main factors for correct selection of measuring or controlling instruments for performing clearly defined jobs under definitely established working conditions are among others:

(1) The profit motive. Every instrument, whether simple or elaborate, whether used individually or as part of an "engineered" elaborate measuring and controlling system must pay its way. This cannot always be assessed in dollars, but the advantage of having such an instrument must be established without doubt. The profit motive should, however, not be applied too rigidly, and where in doubt about its benefits in a borderline case, it is better to have an instrument too many than one missing.

(2) Reliability is the over-riding factor in modern instrumentation. Trouble-free working over long periods is worth a higher initial installation cost and the expense of preventive instrument maintenance by means of regular periodic inspection, testing and overhaul. The generally held belief that a simple design of mechanism is more sturdy and reliable than an elaborate instrument is not necessarily true. Electronic instruments, for example, can give the impression that servicing is a cumbersome job, and the sometimes bewildering number of wires, plugs, switches and electronic tubes might present difficult maintenance. This is, however, not the case with properly designed electronic controllers, having for easy inspection or replacement several plug-in units. The latter can be held in stock and, if an electronic valve should fail after long service, it is only necessary to replace its plug-in-unit by a calibrated spare part.

(3) Satisfactory accuracy. It might be surprising to many plant engineers to find accuracy of measurement, or closeness of automatic control, placed in third position in this summary. This does not mean that accuracy is a factor to be neglected. On the contrary, it is the main purpose of every instrument in a plant to produce accurate results. On the other hand, exaggerated claims in this respect can be costly, and unnecessary small tolerances in measurement do not help in practice at all.

As in most other things, it is highly advisable to work out a good compromise between the demands of the mill engineer and plant chemist for accuracy of control on one side, and the instrument engineers, whether employed at the instrument department of a mill or belonging to the instrument supplier, on the other side. Mill personnel is sometimes unreasonable in their requirements for accuracy of measurement, and even more so when automatic process control comes into the picture.

An experienced and informed mill engineer will keep his requirements for accuracy of measurement high, but for automatic control he will keep them within reasonable limits. The reason for this should be obvious, but is not always realized. Considering, however, that the job of a measuring instrument is to establish facts, but that the purpose of an automatic controller goes much further, namely to use the result of continuous measurements for some form of control action, consisting of definite movements of a regulating unit, it should not be too difficult for a potential user to see that inherent limitations of the process to be controlled also limit the result of automatic control.

The main difficulty encountered in solving more elaborate control problems is usually that process time lags and control cycles are so widely different in practice. Although it is possible to solve many control problems in a mathematical way, the snag is that often these factors can only be ascertained by very elaborate and prolonged actual tests in the plant itself. These tests, however, would in most instances disturb regular plant operation, unless they are carried out on the premises of the maker of the plant equipment, by simulating working conditions.

Co-operation

It will be realized that any measuring or control problem arising in pulp and paper mill can be solved only by closest co-operation between the mill engineering staff, the instrument section in the mill, and the outside instrument supplier. The services of an unbiased instrument expert outside the mill may sometimes be required, and may be highly advisable in order to co-ordinate opinions and to limit requirements for accuracy of control.

This co-operation is also important after instrumentation has been installed in order to keep all instruments working at top efficiency. This is achieved through *preventive instrument maintenance,* i.e., regular periodic inspection, testing, cleaning and overhauling of each installed instrument in the plant. Co-operation is required to work out the schedule for this important job. Introduction of preventive instrument maintenance is not easy, because much depends on working conditions.

In conclusion, the writer would like to state that today's application of instruments in pulp and paper mills all over the world seems to have attained a very high standard indeed. Nevertheless, many more problems are waiting to be solved in measurement and control for increasing paper plant efficiency and reducing manufacturing costs. The introduction of new raw materials in place of wood pulp, such as bagasse, straw, esparto, etc., which might be followed one day by an entirely new method of making paper from artificial fibers, will present mill engineers with new opportunities to find new methods of instrument applications.

Progress in stream improvement

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LARGE AMOUNTS OF WATER are necessary for the manufacture of pulp and paper. This water is not a part of the final product but is used, as an example, as a medium for pulp refining and sheet formation. During its use, solids are added to it, either in solution or in suspension. After its use, when the water is returned to the stream, these solids often cause stream pollution.

There are at least three ways by which any waste can affect a stream and its inhabitants. First, the waste may contain toxic substances that will destroy the aquatic animals and/or plants; second, it may contain materials having a biochemical oxygen demand (B. O. D.) high enough to lower the dissolved oxygen level in the stream to a hazardous point; third, the waste may contain inert solids that, by their very physical effect, may render the stream uninhabitable to its normal population.

In approaching its stream improvement problem, the pulp and paper industry has had to direct its attention to all three of these phases of stream economy. Of the three, the one that is most common and probably the most serious is the problem of maintaining an adequate oxygen balance in the receiving waters. The oxygen problem is caused, of course, by the fact that the papermaker is interested only in the fibrous components of the raw material—the lignin, sugars, and other encrusting materials are of little value, except perhaps in some of the newer processes involving high-yield pulps; of these materials the sugars have a high oxygen demand.

Except in a few isolated cases, there is no industry-wide problem of toxicity. In the case of kraft pulping, there may be toxic wastes, but these are diluted to a point below hazardous levels when they are passed to the stream.

In this report—to be published in three parts—an effort has been made to confine attention to those developments that have been proven either by full-scale commercial operation or, at least, by pilot plant operation. Part 1 deals with the spent sulfite liquor problem, Part 2 with kraft, semichemical, straw and deinking water, and Part 3 with paper mill wastes and methods for the measurement of stream quality.

The problem of inert solids also seems less serious, on an industry-wide basis, than that of oxygen depletion. Excessive fiber loss may create a stream nuisance, but modern practices of the use of savealls of increased efficiency have, in most cases, reduced such loss to a minimum. Deinking wastes may also contain appreciable amounts of inert materials.

On an industry-wide basis, therefore, the major problem is concerned with the use of the streams without causing oxygen depletion to a point inimical to the livelihood of fish and other aquatic forms. This problem is probably the most serious in those segments of the industry employing acid (calcium base sulfite) and neutral sulfite or other modified semichemical processes. In addition, kraft pulp mill wastes although having a moderate B.O.D. value, are sometimes discharged in such large volume that their B.O.D. may be a problem, especially where the mill is located on a small stream. First attention is given, then, to oxygen balance.

Part 1—The spent sulfite liquor problem

ACTIVITY in this phase of the industry's stream improvement problem has been especially vigorous in the past few years. Much research has been done on a variety of ways of either utilizing or disposing of this troublesome waste. The problem is greatly complicated by the large amounts of material which must be disposed of, and also by the economics of the sulfite operation.

Howard (1, 2) and Abrams (3, 4) have discussed the development of the Howard process at Marathon Corp. by which valuable products are recovered from spent sulfite liquor. In this process the sulfite is recovered as calcium sulfite and the lignin becomes available as a solid. From this lignin, vanillin, dispersing agents, tanning agents, and other products are manufactured. Lewis (5) has discussed further the many uses to which lignin can be put, such as in the manufacture of adhesives, corebinders, insecticides, dyes and dyeing, electroplating, emulsions, fermentation, fertilizers, plastics, soaps, etc. At the same time, he pointed out that the sulfite industry in the United States has to dispose of about 2,500,000 tons of lignin a year. The uses described above, tonnagewise, would not require enough lignin to generally improve the stream problem.

And so, in the past few years, more and more attention has been paid to the possibility of burning spent liquor with enough heat recovery to make the process economically feasible.

The evaporation and burning of spent sulfite liquor is not a new proposition. Mills in Pennsylvania and other states have had equipment installed for years and have marketed various liquor concentrates.

More recently the sulfite mills in Wisconsin and Detroit Sulphite Pulp & Paper Co., through their Sulphite Pulp Manufacturers' Research League, have become interested in the Rosenblad evaporator (6). A pilot plant was set up at Appleton (7, 8) which has demonstrated that the calcium base liquor can be evaporated as well as burned. Currently such plants are under construction at Northern Paper Mills, Green Bay, Consolidated Water Power & Paper Co. at Appleton, and Rhinelander Paper Co. at Rhinelander. The installation at Rhinelander has been placed in operation (8A).

Tilghman in his original patent (9) said, "I have found that the addition of sulfite or bisulfite of lime, or other suitable base, to the acid solution tends to make the fibrous product of a whiter color and more easily bleached." Dieckmann (Sulfitzellstoff, 1923) states that Tilghman's first English patent covers calcium, magnesium, and sodium. It was not until comparatively recently, however, that interest in magnesium as a base, in a commercial operation, was developed. The work of Hatch (10, 11, 12), Tomlinson and Wilcoxson (13, 14), Tomlinson (15), and Wilcoxson (16) led to the establishment of the first commercial-scale magnesia base plant in the United States—that of the Weyerhaeuser Timber Co. at Longview, Wash. (17, 18, 19). It does not fall within the scope of this paper to discuss the eco-

nomic aspects of this operation. From a stream pollution point of view, however (the author is indebted to the Weyerhaeuser people for permission to publish this fact), the B.O.D. loading in pounds per ton of MgO bleached pulp is slightly lower than the average for well-operated bleached kraft pulp mills. If the original purpose of the development was to abate stream pollution, then it must be considered a success.

It has been stated (20) that the new mill of Ketchikan Pulp Co. at Ward's Cove, Alaska, will employ the magesium-base process.

The use of ammonia as a base in the sulfite pulping process also has stream improvement implications. A news item (21) in 1945 stated that the Shelton, Wash., division of Rayonier Inc., would use ammonia, instead of lime, as the base for the pulping system, and that the waste liquor would be evaporated and burned. The article also stated that the Shelton installation was the first commercial application of the process on the North American continent.

La Fond and Holzer (22) have described the conversion of the Crown Zellerbach Corp. plant at Lebanon, Ore., from calcium to ammonium base. Palmrose and Hull (23) and Waddell (24) have considered the problem of evaporating and burning the spent liquor at this plant. They have operated a pilot plant on a basis of liquor from 10 tons of pulp per 24 hours with satisfactory results. When these results are translated into a successful commercial operation, another milestone will have been reached in the progress of stream improvement.

Use of spent sulfite liquor in road treatment

In the United States spent sulfite liquor has been used as a road binder for many years. One of the first places it was so used was in and around Spokane, Wash.

It has also been used successfully nearer the West Coast (25, 26). Sherman (27) discussed the experience of the Flambeau Paper Division, Park Falls, Wis., since 1944 in using spent sulfite liquor at 10 per cent dry solids as a road binder. He states that such a treatment is very successful on gravel and dirt roads, if the soil is properly prepared. It not only makes a good road in itself, but it can also be used in preparing beds for blacktop or bituminous surfaced roads. It is calculated that the cost of a 100-mile haul (in 1950) was $16 per 1,000 gallons. Although the character of the soil varies considerably, a yardstick of 10,000 gallons per mile per year is given.

It is also reported (28) that the application of hot spent sulfite liquor to icy roads will pit the glaze and cause an abrasive (sand or cinders) to remain in place after application. The proper procedure is to have the sanding truck follow immediately the tank truck which is spreading the spent liquor.

In the community in and around Appleton the author has observed that "Roadbinder" trucks are only a little less common than milk trucks. In 1951 some 23,000,000 gallons, and in 1952, 30,000,000 gallons, of spent liquor were spread on Wisconsin roads (29, 30).

It has long been known that the sugars in spent sulfite liquor can be fermented to alcohol and other related compounds. Such alcohol is being produced at Bellingham, Wash., (31) and in Canada (32, 33).

Fermentation process

More recently in the fermentation field attention has been directed to the production of fodder yeast from spent sulfite liquor. Many workers have for years investigated the feasibility of making yeast in this way, and several plants have been built abroad. In the United States the program of the Sulphite Pulp Manufacturers' Research League (34, 35), utilizing *Torulopsis utilis*, culminated in the erection of a fodder yeast plant at Rhinelander (36).

The economic feasibility of yeast production, in those cases where the product must compete market-wise with crop fodder, has not as yet been finally determined. In the north European countries, where the amount of forage crops is not as large as in the United States, the success is more certain. From the standpoint of basic nutrition, the yeast process is sound, because it transforms a large amount of unavailable carbohydrate material into available protein material. In an expanding economy, both from the standpoint of population, social and nutritional needs, a new source of protein is bound to be significant, sooner or later.

It is noted that one company, which formerly planned to install an evaporation and burning plant to abate its pollution problem, has changed its plans and will build a yeast plant instead (37).

Pharmaceuticals from spent sulfite liquor

One way, in theory at least, to abate the spent sulfite liquor pollution problem is to make it economically attractive to recover and use the lignin in that liquor. Although lignin itself does not have a high pollutional effect, its recovery automatically removes those liquor elements, the sugars, that do.

The Marathon plant at Rothschild, Wis., has established an impressive record in the field of lignin utilization and, therefore, stream pollution abatement (1-4).

The Sulphite Pulp Manufacturers' Research League has been active in this field also. A research program directed to a study of the derivatives of lignin has been maintained at the Institute of Paper Chemistry for many years. Pearl (38, 39) succeeded in establishing the production of vanillic acid on a practical basis and then prepared a number of its esters. One of these, ethyl vanillate, is of special interest. It exhibits specific fungistatic and/or fungicidal properties. Christie, *et. al.* (40) and Mitchell and Hiss (41) have used it with success in the treatment of histoplasmosis, an internal fungal respiratory disease which heretofore, in its acute condition, had defied remedial therapy. Ellis, *et. al.* (42) have similarly reported success. Ethyl vanillate also shows promise in treating Valley Fever (Coccidioidomycosis), an air-borne fungus spore disease which has shown increasing incidence in

Tank truck in the process of spreading spent sulfite liquor on dirt-type road

the San Joaquin Valley and other areas of California (43).

Pearl and McCoy (44, 45) have shown that, because it is effective in controlling spore-forming and heat resistant bacteria and molds, ethyl vanillate can be effectively used in preserving certain foods, especially bread, cheese spreads, fish and fruit juices.

Disposal of spent sulfite liquor by dilution

In the United States the most common method of disposing of spent sulfite liquor is still the dilution method. Where adequate amounts of receiving water are available, this method is satisfactory. Some streams are large enough to absorb the wastes at all times of the year except the warm weather periods with resulting low water. A mill located on such a stream would not be justified in making a large capital expenditure, as in the case of an evaporation and burning plant, just to take care of its wastes, say, for three months of each year. In such situations the process of disposal by dilution has been accelerated or ameliorated by a number of measures, seasonal in nature.

For example, Lawrance (46) has found that the seasonal odor conditions arising each summer from the impoundment of spent sulfite liquor polluted water in the Gulf Island Reservoir on the Androscoggin River can be corrected and eliminated by the addition of sodium nitrate. He stated that in the summer of 1949 a total of 641.5 tons of sodium nitrate was placed in the river over a period of 44 days. It should be noted that, during critical periods, the mills are required to reduce production by a percentage calculated to be necessary to eliminate the trouble.

Wiley, *et. al.* (47) have described an entirely different procedure for taking care of a unique local situation on the Flambeau River. Employing carborundum diffusers with a total area of 319 sq. ft., set at a depth of 10 feet and fed by a compressor which could supply 1,550 cu. ft. of air per minute at a pressure of 5 psi, it was possible to add to the stream an average of 1.5 tons of oxygen per day at a stream flow of 880 cu. ft. per second. This procedure caused an upstream movement of the zone of recovery.

These two cases are unique in the sulfite industry.

There are several installations in the United States where spent sulfite liquor is seasonally impounded for subsequent release when the receiving stream is high enough to provide water adequate in amount to utilize the dilution method without any troublesome results.

One other development is worthy of mention. In some mills extensive pipelines have been built to carry the spent sulfite liquor to a place where adequate dilution is possible. Two notable cases of this are at Camas and at Everett, Wash. (48). Dispersal of this waste from these lines is facilitated by diffusers; that is, the terminal section of the line has numerous spaced openings situated in a way that the liquor is spread over a relatively large area.

Summary of spent sulfite liquor problem

During the past few years the major developments and installations for disposing of spent liquor have been related to (a) evaporation and burning either with or without a change from calcium as a base, (b) further development in the utilization of lignin, (c) development of specialized fermentations, such as yeast production, (d) use of the liquor in building and stabilizing dirt, sand, or gravel roads, and (e) exploitation of the dilution method. Which of these developments is best suited to any one mill or condition can be determined only after a thorough-going assessment of the conditions in that mill.

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Part 3 of a series

Job evaluation . . .

—selection of plan to be used

J. A. KELLER*

The next article, which will appear in the April issue, will cover job analysis, preparation of job descriptions, and the rating of job requirements

ONCE TOP MANAGEMENT makes the decision to institute a program of job evaluation and formulates the wage policies under which it is to be administered, then the question arises: *Which job evaluation plan should be used?*

The answers to this question and the arguments used to support one type of plan or another are more numerous than the types of plans actually in use today. Broadly speaking, there are only four general types of job evaluation plans, namely

JOB RANKING — where all jobs are ranked between the highest and the lowest on the basis of over-all judgment as to their importance or worth.

JOB CLASSIFICATION—where jobs comparable by judgment are grouped in a selected classification and the classifications ranked as to their importance or worth.

FACTOR COMPARISON — where factors representing job requirements are established, and each job is ranked for each factor; then the job with the highest composite ranking on all factors is judged to be the most important.

POINT SYSTEM—where factors representing job requirements are established and points assigned for the degree that each factor is present in a particular job, points sufficiently weighted by factor to develop composite point ratings of job requirements covering the range of jobs under study.

Point system

Arguments as to the merits of each plan are as endless as the costly element of time, but the point system is preferred and most widely used because it

—provides a measuring stick for all jobs and for each requirement of any one job

—is relatively easy to train people in

—makes it easy to slot new jobs into an already developed job evaluation program

—is almost universal in shop evaluations since it is easy to understand and reduces the area for argument, both necessary in dealing with shop people.

One widely used point system for office jobs incorporates

—seven factors representing job requirements:

1. Experience
2. Education
3. Initiative and ingenuity
4. Attention and concentration
5. Responsibility
6. Supervision given
7. Working conditions

—point values for each factor designed to develop a composite point rating for a given job in a very wide spread from minimum (usually about 40 points) up to about 500 points.

Facility in use of the point system is readily attained, principally because it limits the area of judgment and, therefore, minimizes the experience requirements of the job rater. The use of a point system plan is the safe and sure way to undertake a job evaluation program, a little more detailed perhaps than others—meaningful detail which insures accuracy and facilitates understanding.

Assurance of success

If management wants to convince its employees that it is using objective measures of job worth—that two plus two equals four—then, in making its announcement of its job evaluation program, employees should be told that a point system plan will be used and that copies of the plan will be available for their use and understanding.

The elimination of suspicion and mystery in a new program designed to improve employee relations, such as a job evaluation program, is our only assurance of success. There is much truth in the saying: "The only problems we have are those we make ourselves." Let's not make any problems in job evaluation.. Use a point system plan, describe it, make it available to employees.

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Size-press application of latex coating at the Kalamazoo Paper Co.

Styrene-butadiene type latex upgrades paper coatings

THE FIRST ATTEMPTS to use latex as a paper coating adhesive were made with natural rubber latex in the early '30s. However, no satisfactory commercial process for this purpose was ever developed, largely due to the poor aging qualities of the resulting coated papers.

In the 1940s, when casein was in short supply and its price prohibitive, interest once again was focused on rubber type latexes, especially on synthetic rubber latexes. The styrene-butadiene type latex, known as Dow latex 512K, was first sold to the paper industry in 1946. It was used as a binder for clay-coated printing papers in partial substitution for casein. Since then it has become a standard binder and is used with casein, starch, isolated soya protein, soya flour, and glue to produce clay-coated papers such as book papers, off-set papers, high quality conversion coating base stock, and label and packaging base papers requiring good lacquer and varnish hold-out. It is further used in the manufacture of clay-coated paperboard, wallpaper, fancy coated papers, and decorative wallboard.

Current annual consumption by the paper industry is in excess of 12,000,000 lbs. of synthetic latexes, made up predominantly of various modifications of the styrene-butadiene type, the main suppliers being Dow Chemical Co., U.S. Rubber, Goodyear, Goodrich, Firestone and Dewey & Almy.

This is the second in a series of articles on the application of resins in the pulp and paper industry

Properties

Among the properties which make styrene-butadiene type latex ideal for these applications are: (1) a general upgrading of all coatings in which it is included; (2) smoother printing surface; (3) better fold; (4) excellent varnish hold-out; (5) good wet rub resistance for offset work; (6) reduction of curl, and (7) economical use when compared with other synthetic latexes used in certain specialty papers.

Certain precautions must be observed when formulating coating colors with rubber-type latexes. Due to the fact that the latex particles carry a negative charge, they are precipitated by polyvalent metal ions such as calcium, magnesium, and aluminum. Since most pigments contain small quantities of polyvalent metal ions, they must be buffered with a complex phosphate. This is done by the addition of small quantities of tetrasodium pyrophosphate, sodium hexa-metaphosphate, sodium tetraphosphate, or one of the septaphosphates. For normal pigments about 0.2 per cent phosphate, based on the dry pigment, prevents coagulation of the latex particles. In the case of satin white or English China clays, it becomes necessary to increase the amount of complex phosphate to about 0.5 per cent based on the dry pigment.

Investigation by Dow

Since paper manufacturers are interested in the properties of both coatings and starch-coated papers, modified with the styrene-butadiene type latex, as well as in methods of modifying the regular starch adhesive, an elaborate laboratory investigation was undertaken in the Dow Chemical Co. laboratory by E. K. Stilbert and co-workers using a typical oxidized starch with Dow latex 512K as the adhesive for clay and clay-calcium carbonate-coated papers. Dow latex

512K contains 48 per cent solids and has a viscosity only slightly above that of water. It is an anionic latex with a pH of 9 to 10.5. The film deposited from the latex is soft, tacky, and elastic. Coatings containing it are slightly thermoplastic, a fact which must be considered in the evaluation of coated papers containing this adhesive.

Dow latex 512K was further stabilized in the presence of starch by the addition of 3 per cent casein solids.

The results showed that with coatings containing Dow latex 512K properties such as wet rub resistance and ink-pick resistance were greatly improved by aging. Some loss of flexibility was observed after a year of aging, but it was slight even under accelerated aging conditions.

Applications

The application of styrene-butadiene type latex can be made on all types of coating equipment. Coating operations are mainly carried out on off-machine coating equipment such as brush coaters, roll coaters, and air knife coaters, at speeds of 150-700 fpm.

The most recent and interesting development in the use of styrene-butadiene type latexes is the discovery that they can be used on the size press. When used with starch and clay combination, high solids coatings with low viscosities are obtained that flow and level better than straight starch coatings. When subsequently the sheet is super-calendered, better smoothness is obtained than when starch is used as the only adhesive in the size press coating color. This improved smoothness allows better reproduction when printed and gives better lacquer and varnish hold-out.

Size press coatings are generally run at temperatures between 115-135° F. The pigmented coating can be run on size presses with brass and rubber, or all-rubber rolls. No slippage has been observed on friction-driven upper rolls at a machine speed not exceeding 500 fpm. For higher machine speeds, it may be necessary to connect a drive to the upper roll.

Size press coated sheets, made with the use of rubber-type latexes as a binder, provide a greatly improved base for conversion coatings. By filling out the voids in the sheet and providing an extremely smooth calendered surface, less wax or expensive plastics are needed to meet the rigid specifications set for the numerous products of the paper converting industry. The economy here is particularly marked where expensive coatings are applied, as with polyethylene for instance.

Commercial runs have shown that size press coating with rubber-type latexes will also improve the physical properties of the base paper. With Dow latex 512K a 15 per cent increase in Mullen bursting strength, a 25 per cent increase in tearing strength and a reduction of porosity to ¼ of the porosity of the uncoated stock was shown by a coated sheet which held five pounds per ream total coating weight.

Paper and paperboard making—XXVII

HARRY WILLIAMSON

Figures and Comment on Time Rate of Water Drainage

TABLES I AND II are the work of Messrs. Harry G. Specht and C. M. Connor. By the "count" of a wire mesh is meant the number of warp wires per inch of wire cloth WIDTH and the number of shute wires per inch of wire cloth LENGTH. Wire cloth for use on the paper machine is usually woven with a higher "count" of wire strands to the warp in proportion to the shute wires and it is common practice to express the warp "count" first. Thus, a "count" of 59 x 38 means 59 warp wires to 38 shute wires. The number of openings is found from this expression as 59 x 38 equals 2242 openings per square inch of weave.

From the key Table I we have the following enumeration available:

Total number of wires tested.....27

Classification of type	No. 1 - 8 PLAIN weave with ROUND warp wire
	No. 9 -12 TWILL weave with ROUND warp wire
	No. 13-18 PLAIN weave with FLAT warp wire
	No. 19-27 TWILL weave with FLAT warp wire

Table No. II is a compiled classification of the results of the test to which all twenty-seven of the fourdrinier wires were submitted. For instance we find at the head of the table, No. 2 wire is classified with No. 22 wire; e.g. the time rate of water drainage and the volume of free water in cubic centimeters for both wires under test is the same. All tests were carried out under standard laboratory conditions and the materials, or "furnish" used was the same as that used in the commercial manufacture of high grade tissue paper, namely 100 per cent bleached sulfite, 2 per cent size, and 4 per cent alum. This furnish was beaten or developed to a Schopper-Riegler freeness of 220cc. The table shows the drainage time in seconds for 220 cc. of "slow" or MAT FORMING RESISTANCE water and also the initial rush water volume—FREENESS.

The actual detail of all the factors pertaining to the "freeness" test is dealt with in succeeding chapters of this book. For an understanding and analysis of these tables it is sufficient to know that: (a) the tests applied to all 27 wires were carried out under the SAME CAREFULLY CONTROLLED CONDITIONS, (2) the IMPORTANT unit of measure is SECONDS TIME taken to drain 220cc. of water through the forming mat of fibers and the WIRE MESH on which the formation is taking place, and (c) by classification is meant two different wires showing exactly the same results in seconds time drainage rate and free water volume.

We note from the above classification table the minimum time is 4.010 seconds and the maximum time is 9.320 seconds. We also note that the expression of the result in seconds time is carried out to the very fine extension of 1/100 second. As the object of the test is to find the result in drainage time of any difference in "design construction" of one wire mesh to another, it would be very simple if we found in the table an arithmetical progression either plus or minus showing this condition to exist. However, we find no such definite answer. Suppose we enumerate two examples from which to draw our conclusions.

Examples

In the first example we find at the head of the classification table the results of the tests are equal in time seconds drainage and volume of free water. Reference to the key table shows No. 2 wire to have a PLAIN weave with ROUND warp wire; a construction "count" of 59 warp wires to 38 shute wires which is equal to 2242 OPENINGS per square inch of weave. The open area per square inch is 26.4 per cent. No. 22 wire cloth is of TWILL weave with FLAT warp wire; a construction "count" of 50 warp wires to 40 shute wires which is equal to 2000 OPENINGS per square inch of weave. The open area per square inch is 20.8 per cent.

We have here two wires with a difference in every factor of wire mesh; SHAPE *of* wire strand used; CONSTRUCTION of weave; difference in individual count of warp and shute wires; and also total difference in number of OPENINGS. There is also an appreciable difference in the per cent of open area. With ALL these factors of wire mesh weave construction the tests show that for all practical operating purposes of water drainage NO DIFFERENCE in the TIME RATE of water drainage.

In the second example from the classification table, wires Nos. 14, 26, 16, 17 and 18 are NOT classified by test with any other wire mesh in the table. Indeed, the table indicates that these five wire mesh weaves, besides having the HIGHEST number of seconds drainage time, also have a higher differential in seconds time. Reference to the key table shows that ALL these wires are woven with FLAT wire warp strands, four of them have a PLAIN weave, and one wire is TWILL weave. They also, as a group, have the GREATEST number of openings combined with the LEAST per cent of OPEN AREA per square inch of wire mesh.

From the examination of this table, and using the classification by time seconds alone, definite conclusions of "what most affects water drainage time" can NOT be drawn. Further examination of all the factors becomes necessary. The factors of type of weave, plain or twill, and the shape of wires, round or flat, are embodied in design primarily to resist drive strain and abrasive wear. The factors of number of openings and the per cent of open area per square inch of weave are those with which the papermaker is most concerned.

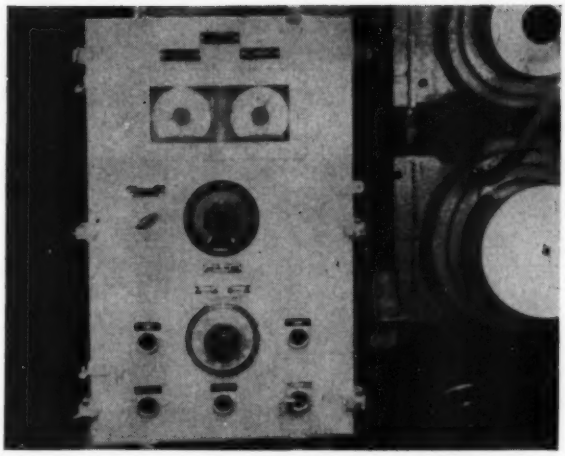
Because of the indefinite nature of the conclusions to be drawn from the classification table by the mere act of such classification, the author has prepared further groups of figures from the papermaker's point of view rather than from that of the wire manufacturer, to further our practical operating information on time rate of drainage of water per square inch of wire mesh weave.

Table No. 1—Wire sample key

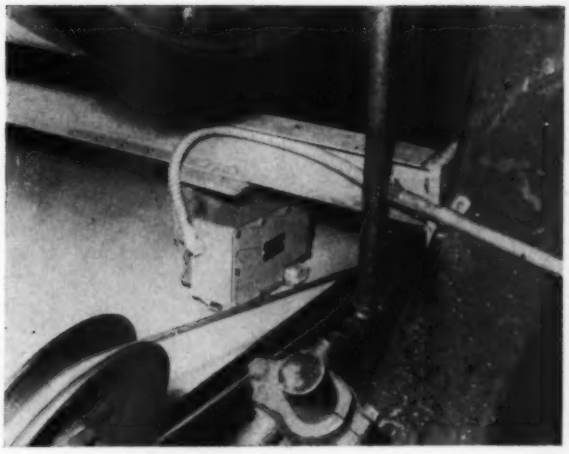
Wire No.	Weave	Construction	No. Openings Per Square Inch	Per Cent Open Area
		Round warp		
1	Plain	59 x 38	2242	26.4
2	Plain	59 x 40	2360	26.4
3	Plain	65 x 44	2860	27.4
4	Plain	70 x 48	3360	26.7
5	Plain	70 x 52	3640	26.3
6	Plain	75 x 52	3900	25.6
7	Plain	80 x 56	4480	27.2
8	Plain	80 x 60	4800	26.8
9	Twill	59 x 38	2242	26.4
10	Twill	59 x 41	2419	25.9
11	Twill	70 x 48	3360	25.4
12	Twill	70 x 52	3640	25.2
		Flat warp		
13	Plain	60 x 50	3000	20.8
14	Plain	60 x 56	3360	19.7
15	Plain	60 x 60	3600	19.3
16	Plain	70 x 60	4200	21.2
17	Plain	70 x 66	4620	20.5
18	Plain	70 x 72	5040	19.6
19	Twill	45 x 40	1800	22.7
20	Twill	45 x 42	1890	22.3
21	Twill	45 x 48	2160	17.1
22	Twill	50 x 40	2000	20.8
23	Twill	50 x 44	2200	20.8
24	Twill	50 x 48	2400	19.8
25	Twill	50 x 52	2600	19.1
26	Twill	60 x 60	3600	18.1
27	Twill	60 x 62	3720	17.2

Table No. II—Classification of all wires on all sulfite furnish. Consistency for test 1.127 grams per liter

Wire No.	Drainage Time 220 cc.	Wire No.	Drainage Volume (Freeness)
2	4.010 Sec.	22	405.0 cc.
22	4.870 Sec.	2	402.0 "
9	5.030 Sec.	1	388.3 "
19	5.130 Sec.	19	385.0 "
1	5.190 Sec.	23	385.0 "
3	5.310 Sec.	6	382.5 "
12	5.470 Sec.	24	381.6 "
7	5.480 Sec.	3	380.0 "
10	5.490 Sec.	9	380.0 "
20	5.705 Sec.	10	377.5 "
6	5.750 Sec.	12	377.5 "
11	5.840 Sec.	25	376.5 "
5	5.850 Sec.	21	375.0 "
23	5.935 Sec.	7	374.7 "
13	6.080 Sec.	27	372.5 "
21	6.090 Sec.	4	370.0 "
4	6.110 Sec.	5	370.0 "
24	6.396 Sec.	13	370.0 "
27	6.500 Sec.	11	368.3 "
25	6.560 Sec.	20	367.5 "
15	6.885 Sec.	8	363.0 "
8	7.040 Sec.	15	360.0 "
14	7.220 Sec.		
26	7.950 Sec.	26	360.0 "
16	8.190 Sec.	16	342.0 "
17	8.860 Sec.	17	337.5 "
18	9.320 Sec.	18	332.5 "



Operator's panel incorporating automatic tension control and indication; top: ammeter and tension meter; center: speed control switch and tension adjusting rheostat, and bottom: speed adjusting rheostat



Tensiometer installed between last two dryers of a board machine; contact roll diagonally opposite conduit entrance; roll touches sheet from the top

Tensiometer increases Glatfelter production

RAYMOND SCHUESSLER

GREATER PAPER PRODUCTION because of fewer paper breaks and less "down time" has been accomplished through closer control of tension at the Spring Grove, Pa., plant of P. H. Glatfelter Co.

Glatfelter, manufacturers of high quality book, writing, bond, and specialty papers, are using the latest improvement in paper machine control, a paper tensiometer, to control paper tension automatically and continuously as the processing paper races between the calender rolls at hundreds of feet per minute. According to Glatfelter engineers, use of the sensitive device manufactured by General Electric has resulted in fewer paper breaks in the machine, less waste, less down time, and an over-all lowering of production costs.

Paper tension, always difficult to control, has previously been controlled in most plants indirectly by regulation of section motor speed or section motor current.

With the installation of the paper tensiometer as an automatic control with an electronic amplidyne sectional drive, tension of moving sheet is held constant regardless of changes in any of the variables affecting tension, such as freeness, consistency, dryer temperature, moisture content, calender stack loading, or friction load variations. The tensiometer utilizes only one short roll and therefore does not complicate the paper threading of the machine.

In operation, the small 4-inch roller on the tension head rides on top of the moving sheet of paper so that a slight "dimple" is depressed into the sheet. Variations in the sheet tension change the air gap of a magnetic structure inside the device, which emits electrical signal proportional to the paper's tension. This is transmitted through the power unit which contains the metering circuits, indicating instruments, and operator's controls.

According to Glatfelter engineers, the paper tensiometer gives continuous and accurate indication of tension variations without damage to the sheet; it is easily adjusted and simple to maintain; it can be used for automatic control, and its fast response time permits its use on the highest speed paper machines.

Paper machine requirements

On a paper machine the sheet starts out with 99½ per cent moisture (pulp in fluid suspension) and ends with 6 per cent moisture on the finished sheet.

During this process, it flows over a wire screen belt, which forms a wet sheet, through felt presses which take out more water, through one or more dryer sections each with several heated metal drums which dry the sheet to its final value, then through one or more calender stacks of polished steel rolls under pressure to press the fibers and finish the surface, and finally onto a reel.

Each section usually is separately driven with means to adjust relative speed between sections. At the wet end, the paper has no tensile properties and yields easily when pulled. At the steam heated dryers and beyond, its tensile strength rises rapidly, but its stretch ability decreases. Small changes in speed between sections at the dry end therefore might cause large changes in tension and might break the sheet. Accurate speed regulation is used usually for holding most sections together. Sometimes current control is used at the calenders and reel sections to hold tension.

Although these methods do a good job and are accepted generally by the industry, it is possible by using tensiometers to simplify operation, hold more uniform tension, reduce paper breaks and generally improve and increase production.

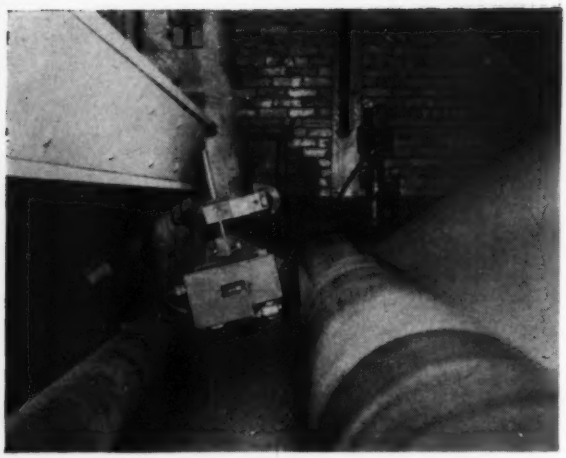
Where there are many steam heated dryer sections, changes in steam temperature and pressure cause variations in paper shrinkage and can cause paper breaks on speed regulated sections unless watched closely and compensated by manual speed adjustment.

Moisture content and shrinkage is affected also by wet end factors such as stock freeness (ability to drain), stock consistency, vacuum in suction boxes under the wire screen, condition and cleanliness of the press felts, tightness of dryer felts, etc.

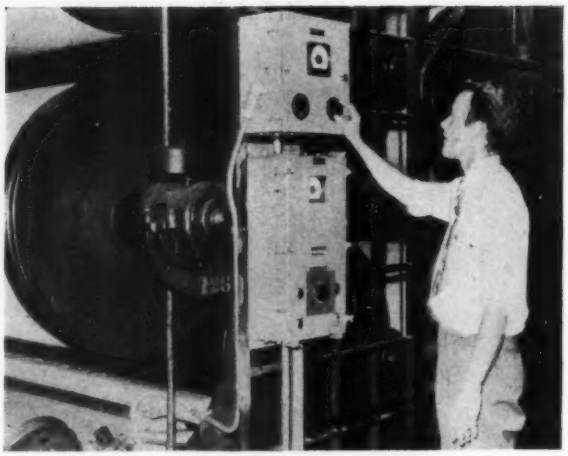
Friction

Where current control is used at a calender stack to hold paper tension ahead of the calender, it is assumed that friction stays constant.

In some cases, this can be far from true. Bearing friction changes. Worse



Tensiometer installed between first calender and second calendar and shown mounted on adjustable lead screw to take care of different pass lines to the second calender



Tensiometer operator's panel shown above, with the operator's panel below; meter indicates relative tension; tension on-off switch at lower left; tension adjust knob at lower right of tensiometer panel

yet, the working load in the nips of a stack of calender rolls is relatively high and is affected by nip loading and by moisture variations in the sheet. The remaining fraction of the applied power available for tension thus can vary appreciably. In addition, variations in outgoing tension in the sheet leaving the calender reflect directly into the sheet ahead of the calender.

A machine tender watches the sheet closely and will pat the moving sheet with his hand frequently to feel tension and adjust speeds when and where he feels it is necessary. Another tender might disagree and readjust. No one knows how much the tension varies from day to day or how much it varies between operators. It is purely personal judgment.

A paper tensiometer assigns a number to the tension and can indicate this continuously and with greater precision than humanly possible. In addition, the tensiometer signal can be used to control paper tension automatically.

Description

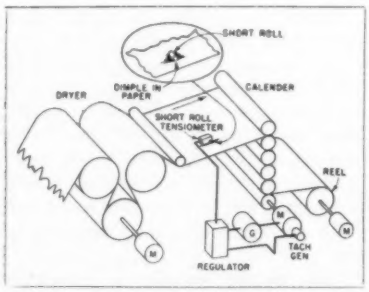
The paper tensiometer is made up of two components, the *tension head* and the *power unit*.

The tension head consists of a small roller approximately 4 inches in length mounted on ball bearings and attached to a short leaf spring. This roller rides on top of the moving sheet. The roller is mounted one half of an inch below the normal pass line of the sheet so that a slight "dimple" is depressed into the sheet. Changes in the paper tension change the roller deflection a slight fraction of an inch. This changes the air gap of a magnetic structure which emits an electric signal proportional to the tension. Roller deflection for rated tension is approximately 0.040 inch.

The power unit contains the metering circuits, indicating instrument and operators' controls when used for automatic regulation. The scale of the indicating instrument is marked in arbitrary units from 0 to 100. The instrument can be calibrated on the machine in absolute units of lb/in if desired. Power output for rated tension is approximately 20 milliwatts. Power input is single phase, 60 cycle, 110 volts.

The entire equipment is well protected and sturdily constructed to withstand conditions normally found in a paper mill.

When used for control purposes the tensiometer output can be applied and adjusted to operate directly in standard electronic circuits used with paper machine regulators. An operator's adjustment is available on the panel for adjusting tension. A switch is provided to permit switching the tension circuit in or out of the standard speed regulator. When used in this fashion, the operator has available at his discretion either speed control or tension control at the snap of a switch. Switching can be done with the sheet on the machine, if properly adjusted.



Four-inch roller on tension head rides on top of the moving sheet of paper so that slight "dimple" is depressed into the sheet

The tensiometer output signal is applied to the electronic regulator circuit so as to buck or boost the tachometer generator signal. The tachometer generator supplies the primary feedback signal. The equipment can be applied to light weight paper as well as paperboard. A fixed adjustment permits setting the leaf spring stiffness in steps to provide tension ranges from approximately 3 lb. per inch full scale deflection to 16 lb. per inch full scale deflection. A range of paper tensions of 6 to 1 or more can be accommodated with any fixed spring setting.

Field test

Tests were made with a preliminary sample tensiometer on three paper machines making three different types of paper. In each test the tensiometer was used for automatic regulation of tension between the dryer and calender. All were successful.

One test was made on a machine making carbonizing tissue running at 200 feet per minute. Another test was made on box board approximately 1/32 inches thick running at 200 feet per minute. A third test was made on clay coated magazine paper running at 1,000 feet per minute.

On the board machine the calender originally was regulated by holding motor current constant. The tension in the sheet was observed to vary approximately 3 to 1 over a period of an hour due to external influences, although the current remained constant. With the tensiometer used for regulation the tension stayed constant over a similar period, and the current was observed to vary approximately 3 to 1.

Operation was stable in all cases and there was no evidence of any damage or marking of the sheet.

PAPER SKETCHES

DURING THE LATE XV CENTURY, Venice, Italy, won world leadership in the book trade, due largely to the fact that paper was available in unlimited quantities from many northern Italian villages which had specialized in paper making since the XIII century. .

ONE of the EARLIEST paper salesmen, supplying the printing trade, was Adolphe Rusch, of Strassburg, who appears to have quit printing in 1480 to go into the paper supply business.

As a sanitary precaution, hoods made of cellulose acetate film are being placed over the caps, lips and necks of milk bottles in some Canadian dairies by means of a newly developed machine.

Odd Bits

PIONEER PRINTERS of the late 1450's saved thirty sheets of paper in the printing of each Bible by crowding forty two lines of type on pages which previously had held only forty.

APPA holds 76th annual meeting

A RESTRAINED OPTIMISM over the future of the paper industry was the outstanding feature of the 76th convention of the American Paper & Pulp Association, which opened at the Waldorf-Astoria Hotel in New York February 15 for an intensive week of general and group meetings.

After 20 years of Washington politics in which business was classed as the bad boy of the American world, the members of the industry felt sure that under a new administration there will be a better attitude on the part of the government toward business. All that the industry has asked is a real "fair deal," not the unfair deal in which business was made the scapegoat for every phase of American life which did not suit the ideas of the better world planners.

The feeling permeated every open and group meeting that under the new administration there will be adequate opportunity for the development of the American way of life through encouragements toward individuals and corporations to do what the American way of life in theory makes possible. No thought of big business taking over the nation was seen anywhere during the week, only a realization that with all the economic handicaps which face the nation after years of war and stress, American business can move forward in a field of equal fairness to the investor, the farmer, the laborer and the public at large.

The various meetings developed the following high spots:

1. The industry is planning progress all through the route from better forests, the making of better papers, to the development of new uses for new papers.
2. With 1953, the industry is more nearly on a self-sustaining basis as regards its basic raw material—pulp—than ever before; already, it is 88 per cent self-contained.
3. Application of research is the key to the future success of the industry.
4. The year 1953 is likely to be the largest production year in history, unexpected international developments appearing to be the only possible cloud in the sky.

The nearest direct approach to reference to the part business can play in Washington was voiced in the Association's open meeting by R. A. McDonald of Crown Zellerbach Corp., when he said that the nation's business was industry's business, and that business men must take their share of the responsibility for proper efficiency in government. His comment was particularly important because he has returned to industry after a term of service in an important administrative capacity in the Government.

Not unduly expansive

The open meeting was, as usual, the high spot of the convention. Sydney Ferguson, president of the Association, said that the growth of consumption was being met by growth in

Better papers through efficient operation theme of APPA gathering

Ferguson reviews "a good year" . . . Tinker calls industry stable . . . Everest forecasts ample material supply . . . preservation of timber urged

CONFIDENCE in continued growth and stability was outstandingly evident at the 76th annual meeting of the American Paper & Pulp Association. Industry executives gathered at New York City's famous Waldorf-Astoria studied the problems of making better papers more efficiently, came up with some answers. But mostly they renewed their interest and furthered their knowledge and went away with the confidence that before too long the eagerness of youth and the guidance of experience that is characteristic of papermaking in the United States and Canada would solve those problems.

At a convention that was busy for four days taking a close look at the myriad facets of a complex industry—from rainmaking to fiscal matters—time was taken for assuring capable leadership. Re-elected to a second term as APPA president was Sydney Ferguson, board chairman of The Mead Corp., while D. S. Leslie, first vice president of Hammermill Paper Co., was chosen to continue as No. 2 man of the association. E. W. Tinker remains as secretary-treasurer, a position he has held since 1940.

The focal point for the entire gathering was the annual Open Industry Forum, which brought together four outstanding industry spokesmen to address a standing-room-only audience at the Starlight Roof of the Waldorf. Tackling the basic subjects of interest to all producers, the speakers coupled optimism with an undercurrent warning against over-optimism. Mr. Ferguson presented his annual report on the industry. R. A. McDonald, former chairman of the executive committee of Crown Zellerbach Corp. and at one time NPA administrator, pointed up the importance of cooperation between industry and government. Ernst Mahler, director of Kimberly-Clark Corp., stressed the constant need for "men and ideas." And concluding the program was a thorough discussion of community relations in the industry presented by Dwight J. Thomson, vice president of Champion Paper & Fibre Co. (Mr. Thomson collaborated in the preparation of the address with Reuben Robertson Jr., president of Champion.)

New APPA vice presidents named at the New York meeting were: J. L. Camp Jr. of Camp Mfg. Co.; Clyde B. Morgan of Rayonier Inc.; Folke Becker of Rhinelander Paper Co., and G. J. Ticoulat of Crown Zellerbach Corp.

'52—a good year

Summarizing APPA and industry progress during the first year of his presidency, Mr. Ferguson expressed warm satisfaction. "1952 was a good year," he declared, "—better than seemed

production facilities, which were not unduly expansive in view of the trend toward increased consumption.

Ernst Mahler, an outstanding executive and technician, featured the need for research as the key to the future.

Dwight Thomson, personnel specialist with Champion Paper & Fibre Co., turned the meeting from industry development to the need for selling the industry to its own workers and to the towns in which the mills are located, as a means of reaching back to the grass roots to give America a true appreciation of the importance of the industry.

Other meetings of the week ran the gamut from the cutting of wood and the development of scientifically managed plantations to the education of the customer in the use of new types of paper, and the wider use of established grades. E. W. Tinker, executive secretary of the Association, said that the forestry program of the industry would assure the nation that it would never run out of paper.

"The pulp and paper companies," he said, "are carrying on the largest reclamation program—the most magnificent program—that the world has ever seen, a classic example of what private industry can do."

This was a cue to the attitude of the industry against a proposal to establish T.V.A. enterprises on every important watershed and indicates that the industry believes that private operation with a minimum of federal overhead can give the nation the power it needs for its paper mills and other uses. Also, the same thought was evident in the stream improvement conferences, where the mills reported on the work being done to prevent contamination of watersheds by pulp mill waste.

In the statistical field, figures on the production of kraft paper demonstrated the manner in which this branch of the industry has had an almost miraculous growth—a growth only made possible by the realization of the need for efficient forestry methods in the South to grow the timber needed for pulp.

Improvement in tax situation

In the field of Washington affairs, there were constant references to future legislation. It was here that the industry spokesmen indicated their belief in ultimate improvement in the tax situation. At no time did any speaker take issue either with the proponents of immediate tax reduction or Mr. Eisenhower's thesis that balancing of the budget must precede tax reduction. Appreciation of the fact that moves in this direction must be carefully planned, possibly for the long pull and not for the immediate present, seemed apparent, with the industry leaders feeling assured that eventual equitable steps will be taken to put the nation on an even keel.

No little attention was given to the problem of "trade not aid," a slogan coined by the proponents of free trade. It was stated at various times that the paper industry now has the lowest rates of duty of any major commodity and has been the victim of some of the most radical cuts. How to meet the demand for radical future rate reductions with steps to preserve the industry's competitive situation in the United States markets was and will be the subject of intensive study. In one of his many addresses during the meeting, Mr. Tinker said the industry is facing the most determined effort yet experienced to negotiate further rate reductions, and that this was a problem to which the industry should give its closest attention.

Taken all in all, the convention week was a condensed, intensive study of every phase of industry operations, and the importance of the discussions was shown by the fact that the attendance was the largest in the history of the industry.

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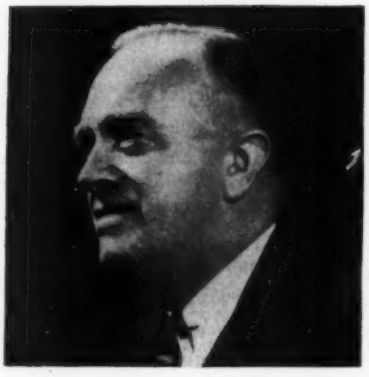
likely to many at the time of our last industry meeting. To me, any industry that operates at over 90 per cent of capacity has every justification to view the situation with satisfaction, and in my judgment the outlook for the industry in the months immediately ahead is good. . . . It can be safely said on the basis of the record, as economic cycles come and go, that the pulp and paper industry will remain in a relatively stable and favorable position compared with other major industries.

"We still have a vast undeveloped field in new uses for paper and paper products that . . . are ever being sought through applied research. Improved processes, better manufacturing methods, as well as increased production, will inevitably result in new outlets and further contribute to our favorable position."

Concluding his annual message, Mr. Ferguson called attention to the outstanding industry men who have served the federal government, bringing a vast and invaluable knowledge to Washington. "During the war and in the national defense program of succeeding years," he declared, "much of the confusion attendant upon emergency conditions such as these has been mitigated because of the ability and experience of the men who represented our industry and represented it well."

Unrelenting search

Even greater service to mankind in the future was foreseen by Mr. Mahler as he discussed "Men and Ideas" at the industry forum. This progress will come, he cautioned, only if the industry is ever on guard against complacency. "Our



Sydney Ferguson
Reelected APPA President

Donald S. Leslie
APPA 1st Vice President

E. W. Tinker
APPA Executive Secretary

D. C. Everest
Marathon

Ernst Mahler
Kimberly-Clark

J. A. Quinlan
St. Regis

D. J. Thomson
Champion Paper

Sen. Capehart
APPA Speaker

Dr. W. E. Howell
APPA Speaker

security," he said, "will depend on unrelenting search for improvement, rather than on accumulation of financial reserves. . . . There are still many mysteries in our basic pulping process: lignin and other constituents of wood; what happens to fibers in refining; even what forces hold a piece of paper together."

Not too many years have passed, he noted, since the industry used softwoods primarily and made two principal classes of pulp. "Now we use many other species of trees and prepare pulps which fall between the chemical and mechanical pulps. . . . Still greater strides will depend on our ability to improve our understanding not only of pulping reactions but of wood's basic constituents. We have to learn more about the tree itself, to use its components more effectively and to grow the kind of tree best suited to our needs. Recent years' work on genetics and heredity factors should point the way.

"... Dollar sales and profit and loss are merely the scoreboard of our industry's activities. They do not accurately portray the depth of our real reserves or our capacity to face the problems of the future. Our real staying power is more accurately indicated by the kind of thinking we engage in and our willingness to dedicate ourselves to new thoughts and ideas—by our patient and intelligent support of both basic and applied research and, above all, by our continuous search for the right kind of young men to pick up the responsibilities which it has been our pleasure and privilege to share during these recent years."

Big business

An urgent appeal for participation by industry in the operation of government was made by Mr. McDonald as he called 1953 a year of challenge—the greatest in 20 years. ". . . a new president took office on January 20—a Republican president. For my money he is a great man," Mr. McDonald declared, "and I hope he will make a great president. I am sure he will do his part, but I ask you: are you ready to do your part? Unless you are ready, he can't make the grade. It will take the time and talents of thousands of . . . American business men to do that job. . . . Our participation in government should be just as active in peace as it is in war. . . . Government is your business *all* of the time."

Mr. McDonald outlined the principles which should be followed by American business to guarantee security in industry as well as in government, for "our security depends on strong industry and strong government:" (1) willingness on the part of business men to participate in government as well as to criticize it; (2) understanding by business of the true value of the competitive system; (3) acceptance of the basic concepts of the Sherman Act and the Clayton Act, and (4) recognition of the true functions of the modern trade association.

> Officers elected to APPA affiliated groups and divisonal associations during the New York, N.Y., convention are listed on page 1482.

Not only are there "musts" for business, the speaker continued, there are also musts for government. "Looking at the solution from the vantage point of government," he declared, "the new administration must: (1) Continue as Secretary of Commerce a man with real business qualifications, both Sinclair Weeks and Walter Williams fill that bill; (2) establish the Department of Commerce as a true business agency (a) by representing the business point of view with the Federal Trade Commission and the Department of Justice and (b) by representing the business point of view on the profit system before Congressional committees; (3) continue the service of dollar-a-year men or WOCs on a plan of rotation; (4) establish basic industry advisory committees with representation from the trade associations, and (5) improve the relationship of government and trade associations."

How to win friends . . .

Champion Paper & Fibre Co.'s community relations program was examined and explained by Mr. Thomson, who outlined the workings of that program since its inception in 1948. (Mr. Thomson spoke as a substitute for Mr. Robertson, president of Champion, who was in Germany on a special mission for President Eisenhower.)

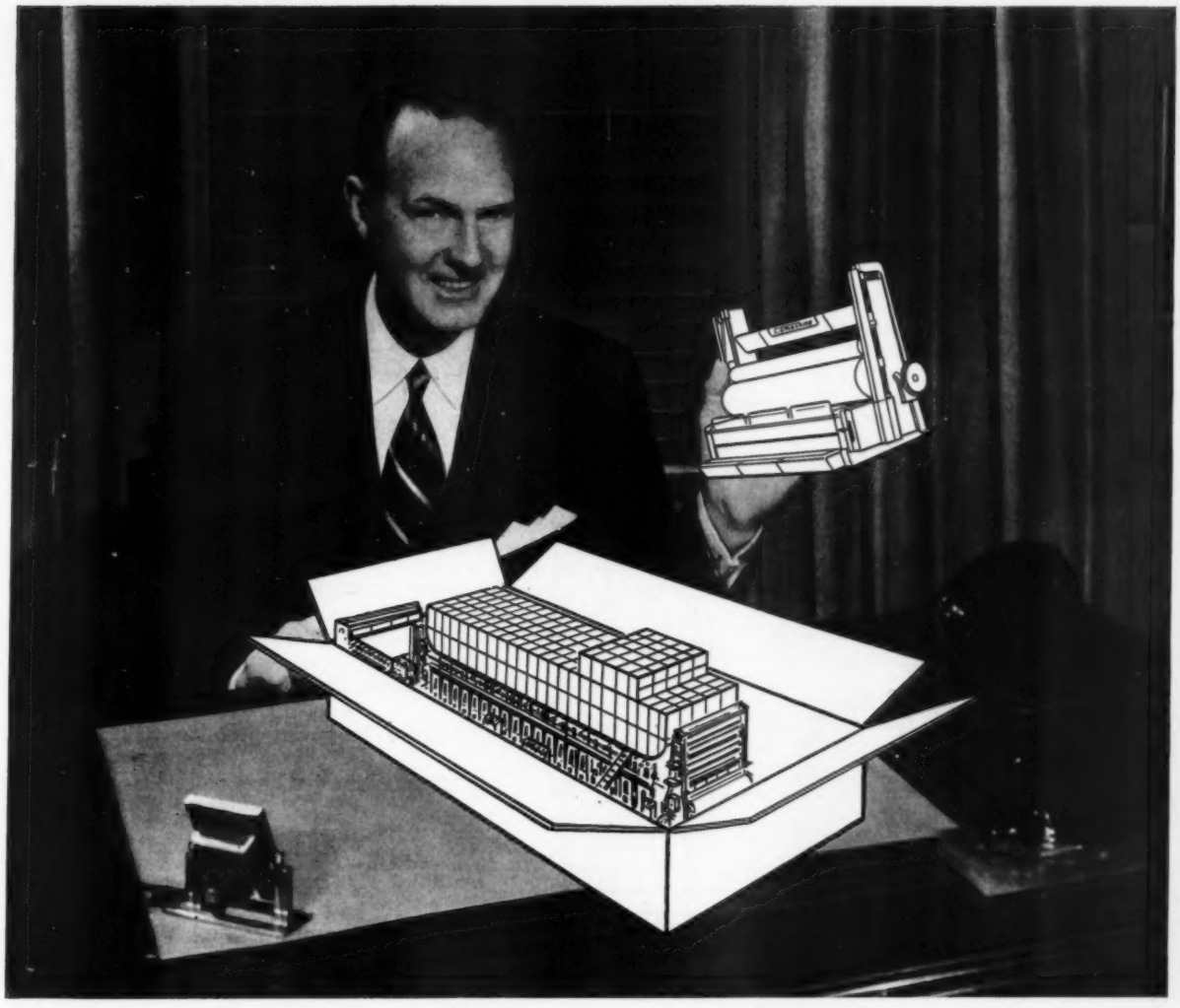
"It is our firm conviction (at Champion) that one of the important jobs of good management is the gaining of as many understanding friends as possible among our employees, customers, shareholders, and the general public," Mr. Thomson declared. ". . . As I see it, we have a job ahead of us that involves not only being a good neighbor in our plant communities, but also having everyone in those communities actively think of us as a good neighbor. . . . Now is the time for us to work vigorously to promote good community relations rather than hold back until sometime in the future when we may be forced into situations by a misinformed public, at which time the cost may be a staggering one and a great deal more than it will be if we use all the foresight that experience has given us."

The three cornerstones of good community relations, Mr. Thomson continued, are (1) good employee relations, (2) the complete cooperation of the executive group—officers, department heads, and supervisors, and (3) good "corporate citizenship" on the part of the firm. "We believe," he said, "it is important to prove to the general public in our communities that we intend to be good corporate citizens and neighbors.

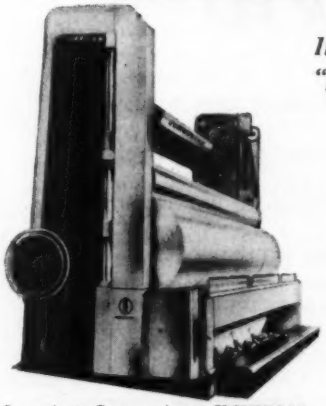
"Such a program," Mr. Thomson concluded, "requires people and, therefore, money. At the present time we have three full-time individuals on public relations work at our general offices, while at the operating divisions the responsibility lies with the industrial and community relations department. We feel, however, that the money is well spent if the general public's attitude toward Champion is favorable, and if we can feel that we are contributing toward the better public understanding of our economic system."

No boom and bust

APPA Secretary-Treasurer Tinker voiced the keynote of the convention when he spiked the commonly-held belief that pulp and paper is a boom and bust industry. Speaking at a press conference on the second day, he declared, "we are



Camachines improve any mill "package"



Investigate Cameron's new IMPERIAL *ultra modern, high-speed mill-type winders, featuring hydraulic controls.*

It is sometimes expedient to purchase a winder as part of an overall paper mill "package". Even so, there's no need to wind up with less than a Camachine . . .

Camachines may be purchased with, or to serve the winding end of *any* paper machine of *any* make. Your paper machine manufacturer can supply a Camachine *easier than* a winder of his own make.

The cost of a mill type winder represents only a small fraction of the total cost of a paper mill and its resources, but that winder is the vital *last* link in the long chain of processes required for paper-making. The performance of the winder, and its reliability are a measure of the efficiency of the entire mill. That's why more than half of the mills in the United States and Canada are Camachine-equipped for top-quality winding. You are invited to consult Camachine engineers for a qualified engineering recommendation on the right equipment to meet your requirements.

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AA-270

NABISCO

Crackers came in barrels . . . fifty years ago. The barrels made useful seats in country stores, too. But the crackers didn't keep fresh and the storekeepers took losses on the stale merchandise they couldn't sell.

So the National Biscuit Company made a paper package for their crackers. It kept all the crackers fresh until eaten and Uneeda Biscuit became the first cracker to be packaged and sold nationally under a brand name. Nowadays, almost every bulk food you can think of is packaged in paper and marketed on a nationwide basis.

THE END OF THE CRACKER BARREL

. . . THE BEGINNING OF A NEW ERA

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one of the most stable industries in the country. . . . As a matter of fact, in trust funds and financial circles paper stock is very much accepted to the point that the boom and bust belief is completely unfounded. . . . The industry is doing everything to insure that we will never run out of wood. It is not a public illusion but the truth that we are making plans to meet expansion needs for the future by the current planning of new growth. When the figures have been put together, the picture will be startling. Paper companies are now carrying out the largest private forestry undertaking in history."

Following a similar line of thought, Dr. Louis T. Stevenson, then APPA economist and now a member in a Wall Street investment house, declared that "in 1932 the paper industry operated at 19½ per cent of capacity. Earnings were at least as good as the national average for manufacturers."

Asked if the industry as a whole shared his "optimistic and enthusiastic" opinions as to the future, Mr. Tinker replied that the inventory situation is "very good from the standpoint of paper. As to the future, the future of the paper industry will depend on the country's economic future, just as in every other industry." APPA President Ferguson voiced complete agreement with Mr. Tinker.

Paper and the business cycle

Continuing the meting with the press, Dr. Stevenson explained how closely the pulp and paper industry coincides with the general business cycle. Using charts of industry trends, he declared his belief that "there is a good chance for paper to beat the 1951 volume, which was 26,300,000 tons. It only dropped 6 per cent last year, and that was the sharpest recession we ever had."

An undercurrent of deep concern for the general public welfare as affected by industrial activities seemed to characterize the statments made by the three APPA officials at the press conference.

A degree of uncertainty

In an address prepared for presentation before a meeting of the Bristol Board Group, Writing Paper Manufacturers Association, Mr. Tinker allayed scattered fears foreseeing a possible slump. "Considering all the factors that normally affect the demand for pulp and paper," he said, "the inevitable conclusion must be drawn that over a 10 or 20-year period the outlook for the industry is indeed a bright one."

"The normal over-all growth pattern of the industry over a period of years," he continued, "has been 3.47 per cent." Mr. Tinker used the following figures to make clear his confidence as to the status of the industry (figures in parentheses represent normal growth rate):

Per Cent Capacity Increases (1950-1952 and 1950-1955)

	1950-1952 Inclusive	Annual Average Increase	1950-1955 Inclusive	Annual Average Increase
Fine (3.23%)	4.4%	1.5%	4.6%	0.9%
Book and Groundwood (2.97%)	2.2	0.7	2.5	0.5
Tissue (5.29%)	7.0	2.3	8.0	1.6
Wrapping (4.24%)	7.8	2.6	12.4	2.5
Newsprint (1.25%)	4.8	1.6	25.8	5.2
All Paper	4.6	1.5	8.0	1.6
TOTAL—Paper and Board (3.47%)	6.5	2.2	11.2	2.2

"In connection with this new capacity," Mr. Tinker continued, "I have every confidence that individual companies gave careful consideration to potential markets. There will without doubt be temporary dislocations. That is a normal situation in any competitive enterprise. Over a reasonable time, however, the facts do not justify undue alarm."

Legislative position

By and large, the policies that have been laid down by the industry in public affairs coincide with the objectives of the administration "as we understand them," Mr. Tinker continued. Noting that the only legislative program now being recommended by various APPA committees involves legislation that would promote the disposal of industrial wastes and would expedite private forestry undertakings, Mr. Tinker outlined the association's general legislative position as follows:

1. Curtailment of federal activities and expenditures.
2. Return to local units the matters affecting them.
3. Removal of emergency controls and regulations.
4. Removal of the excess profits tax, which APPA believes "is not in the public interest."

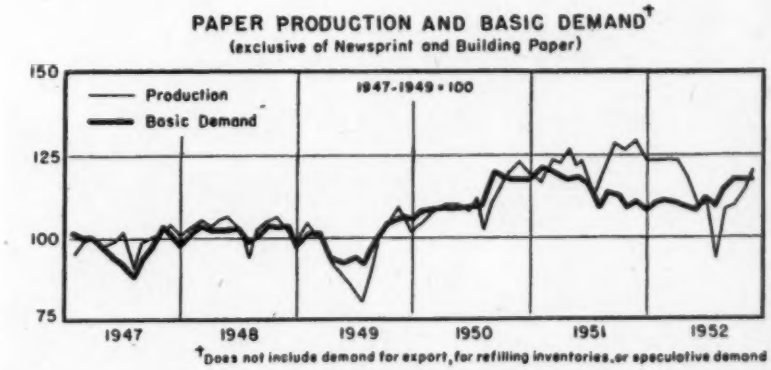
Material supply good: Everest

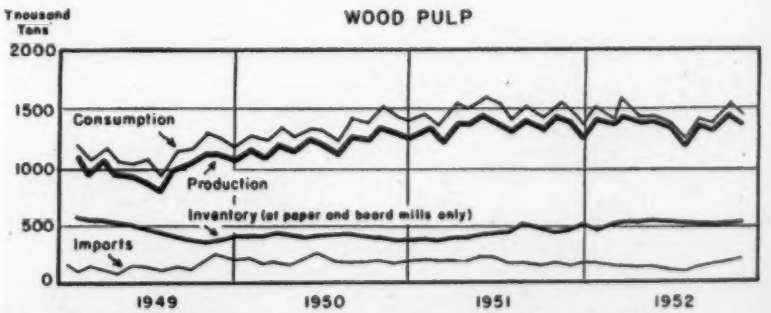
The pulp and paper industry may look forward to adequate supplies of almost all sorts of raw material requirements in 1953, according to D. C. Everest, chairman of the board of Marathon Corp. Speaking before the annual meeting of the APPA Materials Committee, Mr. Everest declared that "on the whole, the situation in relation to the availability of supplies seems better than it has been in years. One might say we are beginning to see a 'normal supply' of those things which we, as an industry, purchase from others."

In his analyzation of the various raw material needs of the industry, Mr. Everest dealt first with pulp.

PULP: "For the first time over a period of several years, I am of the opinion that in all grades of pulp we will have an adequate supply on the North American continent."

WOOD SUPPLY: "The wood supply





GROWTH FIGURES for the industry used by Dr. Stevenson and Mr. Tinker in their discussion of pulp and paper economics

GALA ANNUAL APPA banquet in the grand ballroom of the Waldorf-Astoria Hotel featured an address by Sen. Homer E. Capehart of Indiana

for the Canadian and northern United States mills is adequate for the current year. The only thing which would interrupt the flow of wood from the forests to mills would be . . . low water in some streams or a long drawn out railroad strike."

MANPOWER: "If there is an appreciable step-up in the defense effort effecting increased enlistments, drafting for the armed forces and increased demand for strategic materiel, then the whole industry may suffer from a 'manpower shortage,' which is a thing that cannot be remedied overnight."

COST OF WOOD: "I do not anticipate any lowering of price."

WASTE PAPER: "The waste paper situation is perhaps in the greatest 'state of flux' it has ever been in, at least for a long time. . . . I am surprised at the confusion existent at the moment." All are agreed, however, that "considering the amount of hand labor involved in the collection of waste paper and rags, the present prices at which waste paper is selling do not meet the bare cost of collection. . . . Either the collectors and packers will get a price for their product or curtail collection."

FUEL: Through the "annual gyrations of John L. Lewis . . . mighty few have any confidence left in a coal supply, and were it not for so many companies having plants equipped for coal-burning only and the cost of changing over to gas or oil, there would undoubtedly be many more plants discontinuing the burning of coal.

"Gas, in the territory reached by the large pipelines, seems to be in adequate supply, but there is a constant pressure to increase the price per 1,000 cu. ft."

SULFUR: The situation is "fairly comfortable and with an assurance of supply because of (1) a more sensible survey of amounts needed for export; (2) the discovery and opening up of new properties, and (3) the increase in price that permitted by-product operation to increase the supply, particularly in Canada. If price controls are removed, sulfur may advance in price to $25 per long ton f. o. b. mines."

LIME: "Supplies of lime and limestone continue adequate."

AMMONIA: "Anhydrous ammonia now being produced by several large concerns seems in ample supply."

CHLORINE: ". . . at the moment suppliers can and are taking care of pulp and paper mill requirements. New production is planned for this year and in 1954."

SALT CAKE: "Salt cake seems to be in good supply. . . . By-product salt cake

and imports have materially augmented the supply."

CAUSTIC SODA: "Caustic soda will pretty much parallel chlorine in quantity, but demand seems to be weaker than for chlorine and would suspect that price might decrease somewhat to keep production moving."

ROSIN SIZING: "Presently it looks as though there will be sufficient quantity of rosins to meet all needs. One new plant will come into production in 1953."

ALUM: "Alum will be in ample supply, although no increase in productive capacity is scheduled for 1953."

STARCH AND DEXTRINE: "The starch industry as a whole is due for some added capacity on a gradual increased production basis."

CLAY: "The clay industry has ample productive capacity . . . but there may be an advance of 5 to 10 per cent in price."

TITANIUM: "There now appears to be an ample supply, as one of the principal suppliers has increased its productive capacity 22 per cent with the addition of a new plant."

CASEIN: "At the moment there is an adequate supply, and price is somewhat weak. Personally, I have never liked being dependent on the Argentine for any substantial part of our supply. . . . I would prefer an increased domestic supply."

FORMALDEHYDE: ". . . I am advised that the present situation is easy, without much chance of a change in price."

DYES AND PIGMENTS: "There seems to be no problem in relation to these materials."

MACHINE CLOTHING: "Wires and wire cloth have been in good supply, barring interruptions in deliveries due to strikes. . . . Wool felts have been in ample supply in recent years. . . . There is, of course, much discussion of the use of synthetic fibers in felts, but I do not believe that this will have much effect during the current year. . . . Dryer felts of cotton and asbestos and combinations thereof are in adequate supply."

Mr. Everest reported briefly on various other items of raw material supply. "Polyethylene and other coatings of that type," he said, "are now in short supply, but with added productive capacity coming in, I believe that this situation will be corrected. . . . In Vistanex (the synthetic rubber product), the supply has been short, and there is no evidence of increased productive capacity. . . . By and large, I expect the supply of adhesives will be adequate."

"All I have said," Mr. Everest concluded, "is predicated on nation-wide operations being on about the same pattern as exists today. Any acceleration of the 'defense spending' and particularly any new developments requiring United Nations' action in any part of the world (other than Korea) will require a reappraisal of the whole supply set-up in relation to government requirements that must come first."

Good traffic means economy

The importance of good traffic control to any industry was stressed by J. A. Quinlan, vice president of St. Regis Paper Co., in discussions before the Materials Committee meeting. "The traffic department can assist materially in reducing inventories by eliminating transportation delays, furnishing the most expeditious routes, and generally watching over the movement of all materials purchased," he declared.

"Teamwork with other departments," he continued, "is necessary if we are to obtain maximum results from every dollar spent for transportation. Cooperation from the purchasing agent will enable the traffic manager to negotiate adjustments in the existing freight rates if they are not proper, or he may proceed toward the establishment of commodity or competitive rates where they do not exist."

Efficient merchandising

Continuing the Materials Committee meeting, H. C. Moore, president of Beloit Iron Works, emphasized the three necessary functions that paper mills must perform in attacking the merchandising problem. "The first is a sense of awareness," he said, "of the problem or need—this no doubt the function of the sales department. The second function is that of finding a solution for the problem—the responsibility of the technical group made up of laboratory people, engineers or designers. The third, of course, relates to the operating group and the equipment they have at their disposal. . . . I think a machinery builder's relationship with a mill should be something like that of a lawyer or advertising agent. The best help can be given if we have a relationship in which we understand your general problems and get to know all of your people—from your executives to your operators and their way of doing things. . . . I feel that the worst thing any operator can do is to lose intimate contact with his suppliers and his competitors."

Mr. Moore called particular attention to the obsolescence of much of the paper mill equipment now in use. "Because the paper machine is a large assembly of many sections," he said, "it lends itself to modernization by degrees; individual sections can be replaced or rebuilt, and a good deal of this work has been done and will be done to good advantage. . . . One of the greatest challenges to the machinery builder today is to build machines of such improved design as to compete favorably with units that are written off or that were bought with better dollars than we have today. There are too many obsolete paper machines operating in the industry. This is not a healthy condition, and we propose to do all we can to remedy it."

Waste paper problems

The problem of waste paper quality has reached a stage where something must be done about it. Concluding the Materials Committee gathering, Henry J. Perry, director of the Waste Paper Utilization Council, pointed to the fact that there is now an instrument—the Council—by which paper and paperboard mills and allied industries are commonly bound to work toward the solution of the problem.

The industry must consider that (1) waste paper is a source of cellulose fiber for a major portion of our packaging industry, the foundation upon which our modern merchandising system rests, and (2) that the use of waste paper is one of our greatest forest conservation measures, and that—if we cannot continue to increase its use and value as a papermaking material—we have to raise our pulpwood cut by at least 50 per cent to compensate for its loss.

"Thus," Mr. Perry declared, "we must accept, believe, and preach a philosophy that waste paper is not a waste product but a secondary source of cellulose fiber, so valuable that at least half of our industry depends upon it as a raw material."

Considering the variouss complaints that arise often in connection with the use of waste paper as a raw material, he said that "there is a wide open field for proper merchandising of secondary cellulose fibers. A dealer cannot continue to alibi his poorest packer. . . . Likewise, the mills have the responsibility of defining what they want and what they cannot use in simple understandable terms and recognizable descriptions and then be willing to pay for good packings."

Guaranteeing the trees

Four experts on forest management discussed management policies at a forum staged by the Forest Policy Committee of APPA. The moderator was James L. Madden of Hollingsworth & Whitney Co.

Declaring that his firm's basic policy in relation to its own forests is "to build up the growing stock," A. C. Shaw of The Champion Paper & Fibre Co. said that Champion's general policy is in three phases: (1) association work and activities; (2) projects with landowners, and (3) the company's own land ownership program.

The three phases stressed by Clyde Martin of Weyerhaeuser Timber Co. were: (1) the determination of actual

forest inventories by use of the Remington-Rand system of record-keeping; (2) studies concerning natural rejuvenation problems, efficient fire protection, and help to smaller timber holders, and (3) utilization of forestry research so as to study new problems about growing timber.

Dwight Demeritt of Dead River Co., which controls 10,000 acres of timber in Maine, declared his belief that New England can grow as much timber as can the South. He explained that, while trees grow faster in the southern states, more per acre can be produced in New England.

Southern paper and pulp manufacturers have over-bought timber lands, according to C. G. McLaren of National Container Corp., and as a consequence are paying excessively high prices for stumpage and pulpwood. He said that it would be much better policy to rely on the individual small land owner, who grows timber as a crop.

Community good feelings

One of the highlights of the four-day meeting—and one that gained constant attention—was the community relations exhibit sponsored by the APPA Community Relations Committee. Two showrooms were devoted to various materials distributed by pulp and paper firms throughout the United States, one room being devoted entirely to mills in Wisconsin. It has been in this state that the group has been functioning actively for the past three years. N. H. Bergstrom, president of Bergstrom Paper Co., Neenah, is chairman of the APPA committee and also of the Wisconsin group. Donald M. Rochester of APPA is secretary.

The display included employee handbooks, employee magazines and management news letters, special publications, annual reports, scholarship programs, industrial fairs, press relationship activities, guided tours and open house literature, school cooperation, recreation associations, radio programs, etc.

Firsthand View of Russian Industry Given by SAPI Speaker

David Cheever Jr.
SAPI President

Oliver P. Vickery
SAPI Speaker

WORLD POLITICS will be drastically changed as a result of the 1952 International Economic Conference in Moscow, according to Oliver P. Vickery, San Francisco exporter-importer. Addressing more than 1,700 at the annual luncheon of the Salesmen's Association of the Paper Industry at the Waldorf-Astoria, he told of his experiences as a delegate at the conference—as a business man and not as a representative of the government.

Mr. Vickery declared that the meeting "was the first round in the Kremlin's effort to drive a wedge and separate America from England, France, and other NATO countries." While in Moscow, he said, he was permitted visits to Soviet factories, including a textile plant and the tremendous Stalin car plant.

Cheever new SAPI president

David Cheever Jr. of Hollingsworth & Whitney Co. was introduced at the luncheon as the 1953-54 SAPI president. Formerly vice president of the group's New England division, he succeeds William J. Tilden of Mead Sales Co., Chicago.

It was announced during the gathering that George M. Watson of Mead had been presented the President's Award for 1952-53. The prize goes to the member (not an officer) who, in the opinion of the president, performed the greatest service to the organization for the past year.

U.S.S.R. trade contracts

Describing his welcome in the Soviet Union, Mr. Vickery said that he and other delegates "were wined and dined on a scale that would make Perle Mesta and Elsa Maxwell envious." He declared that the "doors were open wide. . . . The Soviets were emphasizing economics rather than diplomatics."

The speaker said he told his hosts that there were facilities in the United Nations for legitimate economic trading between nations. However, he was told that the U.S.S.R. had lost faith in the U.N. and insisted on carrying out trade contracts in her own Soviet way.

Additional SAPI officers

Other SAPI officers elected at the New York meeting included: Gene Hanson of Brown Co., New England vice president, and Robert Reid of Hamersley Mfg. Co., New England assistant vice president; H. M. (Stub) Early of International Paper Co., western vice president, and Paul Craig of Champion Paper & Fibre Co., western assistant vice president; Larry Graham of International, eastern vice president, and Henry Cole of S. D. Warren Co., eastern assistant vice president.

Standby Economic Controls Urged by Sen. Capehart at APPA Banquet

CONFUSION AND DISLOCATION in business could be avoided during time of a national emergency were standby economic controls available to the federal government. Addressing the annual banquet of APPA at the Waldorf-Astoria's grand ballroom, Sen. Homer E. Capehart (R, Ind.) declared that the time to avoid the spiral of inflation is at the moment that the emergency begins.

The chairman of the Senate Committee on Banking and Currency attacked the Truman administration for its apparent lack of concern for economic crises at the outbreak of the Korean War. He cited the fact that he had, at that time, urged the immediate freezing of prices and wages. President Truman, however, declined to act. It was not until several months later that the administration put into effect the controls act, containing the famous Capehart Amendment. By that time, Senator Capehart said, the cost of living had risen 7 per cent.

He disputed the belief that Congress could act with the necessary speed at the first signs of emergency, said that standby controls would always be in readiness and could be put into effect immediately. Without such controls it would be several months before a proper legislative program could be drafted. In that time, he continued, hoarding can have its evil effect, and the spiral started.

Government our asset

Pledging his wholehearted support to "undo the damage of the past 20 years," the speaker praised the American system of government as this nation's greatest asset. That system of laws, he continued, has made this country what it is, has been the one thing more than any other that has made the growth and well-being of the United States possible. Although playing important roles, such blessings as location and natural resources and climate cannot be given full credit; neither can the inherent intelligence of the people, for those people are, after all, a mixture of all nationalities.

The senator was introduced by APPA President Ferguson. A special feature of the program was a short talk by R. M. Fowler, who conveyed greetings from the Canadian Pulp & Paper Association, of which he is president.

Operational Problems Take Spotlight at 38th Annual Tappi Convention

ACID PULPING, corrugated container operating problems, water supply and pollution, digester corrosion were among the problems that received more than average attention at the 38th annual meeting of the Technical Association of the Pulp and Paper Industry. The meeting was opened by K. P. Geohegan who, in his presidential report, characterized the year 1952 as one of great progress. The same optimism permeated Executive Secretary R. G. Macdonald's report, which disclosed strong Tappi committee activity in numerous fields of technical endeavor.

The election of George Pringle of The Mead Corp. as the new Tappi president, and of Karl O. Elderkin of Bowaters Southern Corp. as the new vice president was confirmed at the general meeting. The new executive committee consists of Harry C. Moore, Beloit Iron Works; Norman I. Bearse, Champion-International Co.; John Buss, Provincial Paper Ltd., and Charles J. Sibler, West Virginia Pulp & Paper Co.

The first day's afternoon program was filled with various committee meetings. W. F. Holzer, Crown Zellerbach Corp., presided over the Research Development Committee; Ralph W. Kumler, American Cyanamid Co., was chairman of the Industrial Division; L. K. Burnett, Ohio Boxboard Co., Converting & Consuming Division; K. O. Elderkin, Bowaters Southern, Pulp Manufacturing Division; R. T. Price, Hammermill Paper Co., Paper Manufacture Division; J. d'A. Clark, consultant, Testing Division, and C. J. Sibler, West Virginia Pulp & Paper, Engineering Division.

A record attendance was reported at the four-day meeting, which was staged at the Commodore Hotel, New York, N.Y.

Water for papermaking

Stream pollution problems have become limiting factors in water supplies for the pulp and paper industry, said C. A. Snavely, Battelle Memorial Institute. Most of the water must be upgraded after it is taken into the mill, where it becomes degraded during passage through the mill. Limits now set on the discharge of this degraded water into the stream are responsible for many changes in water practice. The stream pollution situation is now being faced realistically, continued Mr. Snavely, and closer control over water supplies and uses must necessarily be implemented. Technological advances in the use of water have been significant, so that water needs will not increase as rapidly as total production.

The current trend to develop more and more ground water for industrial utilization has produced many new important scientific tools for use in ground water hydrology, said Nicholas A. Rose, Houston, Texas, consultant, such as (1) the application of the Theis non-equilibrium formula which permits the determination of draw-downs of water levels caused by given rates of pumping; (2) electric logging of wells to differentiate the type of formation encountered in drilling and the quality of water contained in the water-bearing strata.

A rapid method for the determination of the suspended solids in white water streams was described by E. A. Mason and R. R. Quincy of the Massachusetts Institute of Technology. The determination is made by a small hand-powered centrifuge and calibrated glass tubes.

Stephen Bergen, Conservation Foundation, presented an interim report on the water use questionnaire which was forwarded by the Water Committee to all pulp, paper, and paperboard mills in the United States in November 1952.

Structural fibrous materials

Wayne C. Lewis of the Forest Products Laboratory, Madison, Wis., reviewed hardboard manufacturing processes and discussed the increasing rate of hardboard production. The number of producers, he said, is increasing at a more rapid rate than actual production, because most of the new facilities are small when compared with those of the well established producers.

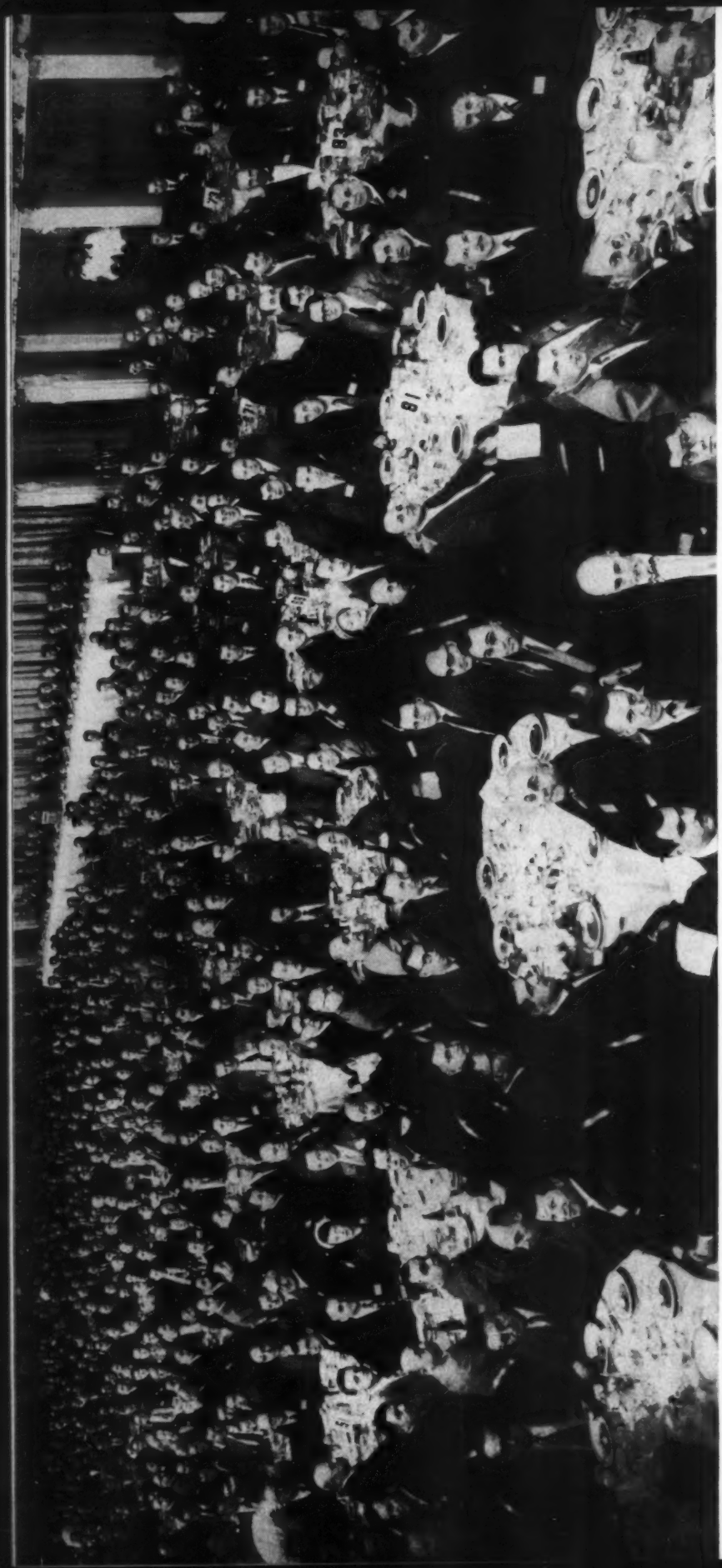
Among the peculiarities of white oak hardboard stock, S. L. Schwartz, also of the Laboratory, listed the requirement of a disproportionately large quantity of affixing agent, such as alum or ferric sulfate, to set the size. Furthermore, the quantity of size, rosin, or paraffin required to obtain optimum flexural strength lies in the range 0.75 to 1 per cent.

C. K. Textor, Bauer Bros. Co., discussed the relative merits of board furnish evaluation, comparing a modification of Tappi standard T205 method with a suggested method T1001-SM. His conclusion was that the modification of standard T205 method is quicker, requires less stock, and less equipment, and is quite satisfactory for the evaluation of tensile and transverse strengths. For all other purposes the suggested method T1001-SM promises to be far superior, because it furnishes additional

Geo. H. Pringle
1953-54 Tappi President

K. P. Geohegan
Retiring Tappi President

R. G. Macdonald
Secretary of Tappi



TAPPI MEMBERS during their annual luncheon at the Commodore Hotel; principal speaker was Allen Abrams of Marathon Corp., whose talk was followed by the presentation of the Tappi Gold Medal to Roger C. Griffin

information, appearance, density, and moisture content.

H. Dale Turner, Forest Products Laboratory, presented a paper on evaluation of refiner-plate designs. In a second paper, he discussed the application of the refining energy index concept to experimental evaluation of strength-yield relations for hardboard stocks. He emphasized the significance of the energy index, which is given by the ratio of hardboard bending strength to energy consumed in refining. He showed that the energy index increases directly with decreasing yields.

Corrugated containers

Ray A. Thompson, Samuel M. Langston Co., discussed machinery to manufacture glued lap joint type containers. The first commercially available machine to make this type, he said, was a combination folder and gluer. Later a semi-automatic version of this machine was developed. We now have sufficient experience with glued lap boxes to predict that the glued lap joint will soon take its place with the well-known stitched and taped joints in the manufacture of corrugated shipping containers, he said.

Alfred W. Hoffman, Container Laboratories Inc., reviewed the requirements of lap joints on corrugated and solid fiber boxes set up by the Consolidated Classification Committee. He discussed the merits of glued lap joints as compared with those of taped and stitched joints from the standpoint of price, performance as based on laboratory tests, and other inherent features.

Since corrugating medium may be run as thick as 0.018, flute contour design of corrugating rollers must accommodate this wide variation in medium thickness, said Arthur Werner of SOS Corrugated Paper Machinery Co., in his paper on "Improved Flute Contours and Advantages of Chrome Plating of Corrugating Rollers." The life of steel corrugating rollers remains a metallurgical as well as a paper mill problem, he continued, since it is quite impossible to eliminate small quantities of fine sand and other abrasive material from the paper. The great advantage of chrome-plated rolls is that they are used until most of the chromium coating is almost removed by the abrasives in the paper. They are then chromium plated, a process which can be repeated without reducing the original form of the chrome-moly rollers or the original diameters.

Allen Abrams
Marathon

H. C. Moore
Beloit Iron Works

Chrome plating of corrugator rolls was discussed by P. Boggio of Modern Hand Chrome Service Co.

Acid pulping

Discussing acid pulping with sodium sulfate liquors, George A. Richter, Eastman Kodak Co., said that recovery processes consisting of a reducing type of furnace and means for separation of sulfite from carbonate with subsequent conversion of the carbonate to sulfite have been engineered but have not been put into actual use in this country. Such a system may also include facilities for conversion of sulfide to sulfite or for means of using the separated sulfide in an adjoining kraft pulp operation.

Gordon A. Crowe, Spencer Chemical Co., listed the advantages of the ammonium-bisulfite pulping process, discussed the results and merits of an ammonia test run, and described equipment modifications for either a temporary or permanent installation. He further made recommendations for storing and handling ammonia and presented figures obtained from a test in which brass was exposed to ammonium bisulfite solutions.

Sulfur usage and distribution in sulfite pulping was the topic discussed by C. H. Anderson of Rayonier Inc. He presented data relating yield of unbleached sulfite pulp and sulfur consumption, as well as yield and distribution of sulfur among the process streams. The results showed that as unbleached pulp yield was increased from 40 to 50 per cent, sulfur consumption (without stripping) decreased from about 265 to 170 lbs. per air dry ton of pulp. At 46 per cent yield, sulfur consumption amounted to 180 lbs. per ton. Sulfur consumption was reduced 10 to 20 lbs. per ton by stripping the flashed spent liquor. The sulfur consumption of 180 lbs. per ton at 46 per cent yield, as shown by these figures, falls between a theoretical value based on the sulfur content of lignosulfonic acid and the reported experience of Canadian pulp mills.

A paper on the use of spent liquor in reconditioned asphalt road surfaces, by G. K. Dickerman and co-workers, Sulphite Pulp Manufacturers Research League, Appleton, Wis., described practical road tests in Wisconsin in which secondary roads in advanced stages of traveling had been reworked with a grader to pulverize and redistribute the old surface material and then sprayed with spent sulfite liquor from a tank truck. A new and tight bituminous surface resulted in a few days under normal traffic conditions. Such reformed surfaces stood up well after a year of service through a northern Wisconsin winter without apparent damage from spring breakup.

Yields of 63 to 65 per cent of news grade sulfite pulp were reported by Frank P. Silver and L. R. Beath, Price Brothers Co. Ltd., from a mill-scale pilot plant which has been in operation for nearly three years. The pulp as shown by commercial tests is entirely satisfactory for newsprint furnish. A brief description was also given of a new plant now under construction which will have a manufacturing capacity of over 700,000 lb. per day of newsprint made of the high-yield sulfite pulp.

A modified Karl Fisher titration method for the determination of total water in liquors was described by J. H. Phillips and M. M. Rubrith, Babcock & Wilcox Co. The method has given satisfactory results for all types of residual pulping liquors.

Savings in power, increase in capacity, and cleaner pulp were obtained in one mill due to the introduction of a Cowan centrifugal pulp screen, the latest design of a free tailings discharge-type rotary screen, it was reported by W. C. Stevens, A. T. Lynch and T. W. Estes, all of International Paper Co.

Digester corrosion

F. W. Flynn, F. B. Snyder and F. H. Richter, Babcock & Wilcox Co., listed a major cause of digester corrosion as shown by an etxensive study and experimentation on this corrosion problem. The corrosion is believed to result from a boiling action that takes place on the metal surface when small quantities of liquor contact the hot digester shell. This boiling action is similar to that occurring when small quantities of water are dropped on a hot plate. This splashing during refilling a hot digester, therefore, is a major source of hot plate boiling and consequent corrosion. Two different ways of stopping hot plate boiling were suggested. One method involves the use of a specially designed metallic digester liner, and the other

A Lifetime Devoted to Science— Roger C. Griffin 1953 Tappi Medalist

ROGER C. GRIFFIN has served Tappi unselfishly since 1915. He received its highest honor—the Tappi Medal—at the 1953 annual luncheon in New York's Commodore Hotel.

Born in Montclair, N.J., in 1883, he was graduated from Harvard *magna cum laude* in 1904, receiving his S.M. in chemistry at that school in 1906. Mr. Griffin spent a year as a chemist for Mallinckrodt Chemical Works in St. Louis, after which—in 1909—he joined the staff of Arthur D. Little in Boston. The senior partner in the firm was Mr. Griffin's father, who had been superintendent of the first sulfite mill in the United States.

In 1918 the firm was moved to Cambridge. Mr. Griffin served as a director for 20 years, as treasurer for nine years, and vice president for three years. He retired in 1949 after 40 years' service.

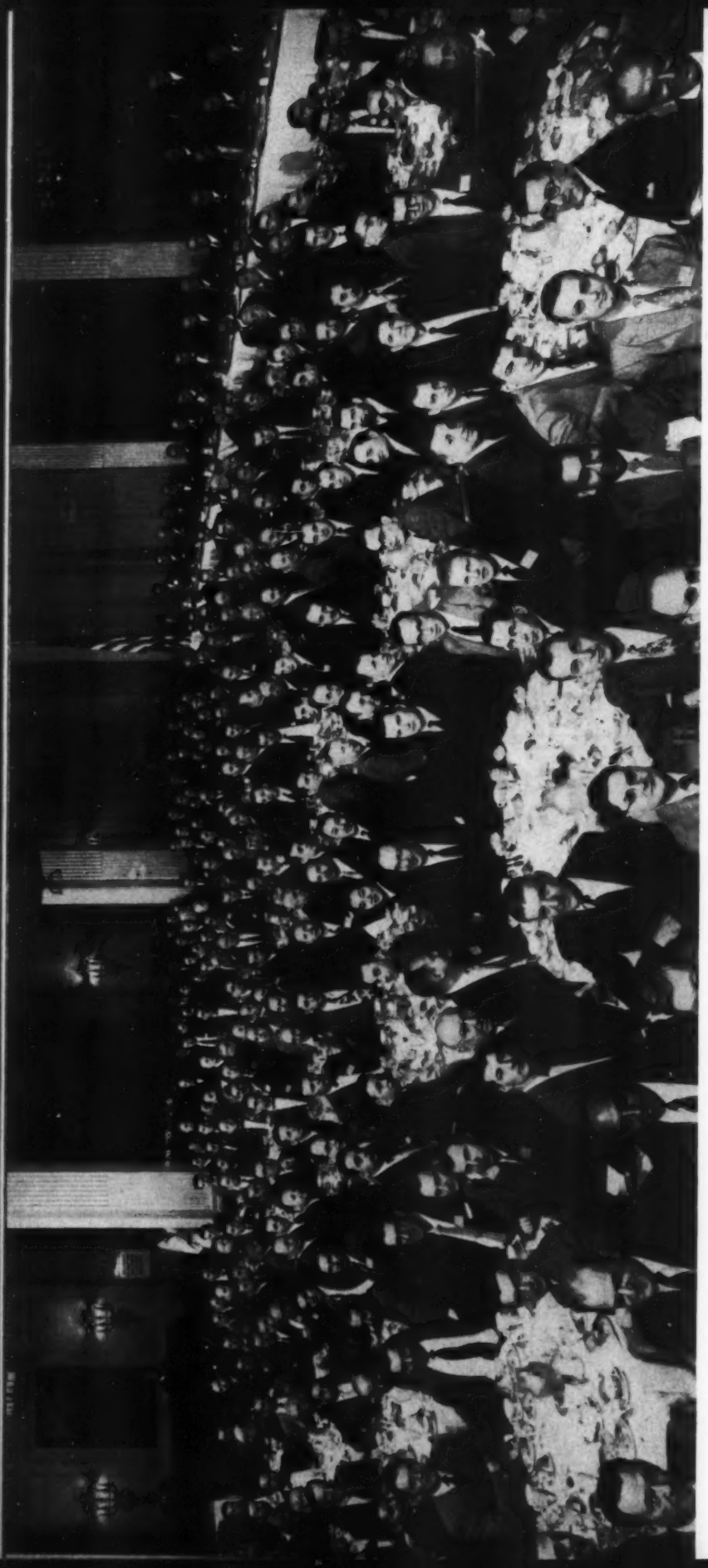
A member of the American Chemical Society since 1909, he organiized Committee D-6 on paper for A.S.T.M. and served as its first chairman. He was a member of the A.S.T.M. executive committee from 1940 to 1942.

While a Tappi member, Mr. Griffin has served as chairman of the nonfibrous materials committee, as general

Roger C. Griffin
1953 Tappi Medalist

chairman of the testing division, and as chairman of the standards committee. He was a member of the executive committee from 1936 to 1941, and served as chairman of the New England Section in 1936.

His writings include the book "Technical Methods of Analysis," which contains sections devoted entirely to the analysis of wood, paper, and papermaking chemicals. Since 1936 he has prepared the annual reports of the Tappi Standards Committee.



ALUMNI of Maine and Syracuse gather in the grand ballroom of New York's Roosevelt Hotel to pay tribute to Prof. C. Earl Libby; the former head of the Syracuse pulp and paper department—and a graduate of Maine—recently retired after 33 years at the New York school

involves admission of the filling liquor at the bottom of the digester rather than at the top.

Making some observations on the causes and prevention of kraft digester corrosion, Edward W. Hopper, Crucible Steel Co. of America, said that carbon steel kraft digesters gave good service life prior to 1934-1935. Since that time undetermined changes have been made which in many cases have cut the life of a digester to one to two years.

S. J. Baisch, Thilmany Pulp & Paper Co., reported on his experiences with field applied Inconel digester linings. He observed excessive cracking in the welds adjacent to the Inconel strip, as well as scale formation between the lining and the carbon steel backing of the digester.

H. F. Peters of Lukens Steel Co., in his paper on pressure vessel steel specifications and related processes, explained the terms killed, semi-killed, and rimmed steels, the former two types having a higher silicon content. The only possible factor that may have an effect on digester corrosion is the question of silicon content in the steel, Mr. Peters continued. Before the development of the automatic welding process, he said, digesters were fabricated by either riveting or forge welding. Steels for these purposes were of the true rimming type. However, it was found that rimmed steels in gauges of 1" and more were difficult to fabricate by the automatic welding process. The steel companies, therefore, have been supplying killed and semi-killed steels.

Preparation of papermaking materials

Factors affecting formation of resin-aluminum sulfate complex were reviewed in a paper by E. F. Thode, J. F. Gorham and R. H. Atwood, University of Maine. The small additions of aluminum sulfate, it was reported, resulted in a rapid change from the negative potential of resin to a positive value. A maximum positive value was obtained at about 1:1 ratio of aluminum sulfate to resin size.

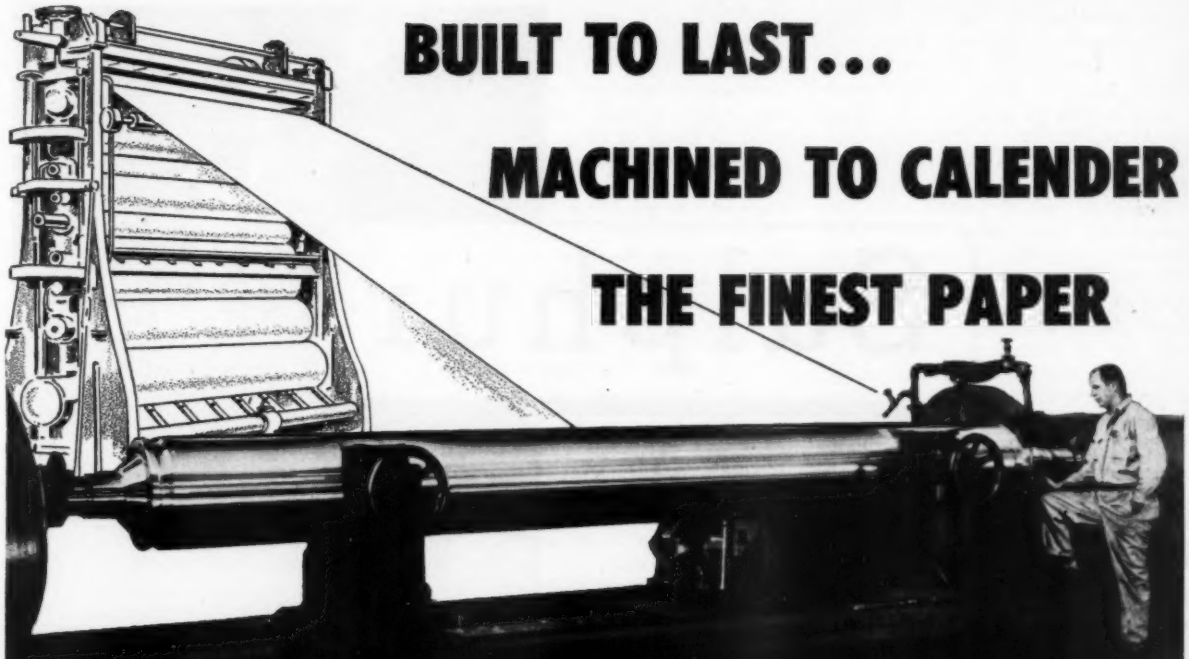
In a second paper on surface properties of resin size precipitates, J. F. Gorham and E. F. Thode of the University of Maine reported that the presence of sufficient alkaline-earth sulfates tend to decrease the mobility of resin-aluminum sulfate complex, while in the presence of many metallic chlorides the electrophoretic mobility of the complex is increased.

Discussing the removal of dirt and

BUILT TO LAST...

MACHINED TO CALENDER

THE FINEST PAPER



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MADE TO WITHSTAND PITTING AND CORROSION

The fine precision forged stainless steel rolls produced by Midvale craftsmen have won a reputation for their long life in the paper industry. In some installations where regular rolls in the water box position pitted and corroded badly . . . Midvale stainless steel rolls are still running without regrinding.

Every day the reliability of Midvale stainless steel rolls is being proved in America's leading paper mills. The skill and experience of Midvale craftsmen assure rolls built to the most exacting specifications of hardness and finish. Modern equipment and quality control—from furnace to finished roll—produce rolls unsurpassed in performance.

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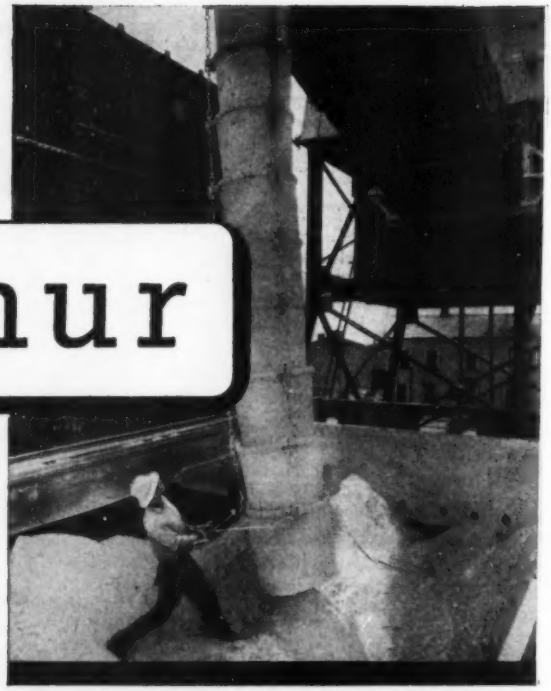
Custom Steel Makers to Industry

PRODUCERS OF FORGINGS, ROLLS, RINGS, CORROSION AND HEAT RESISTING CASTINGS

Sulphur

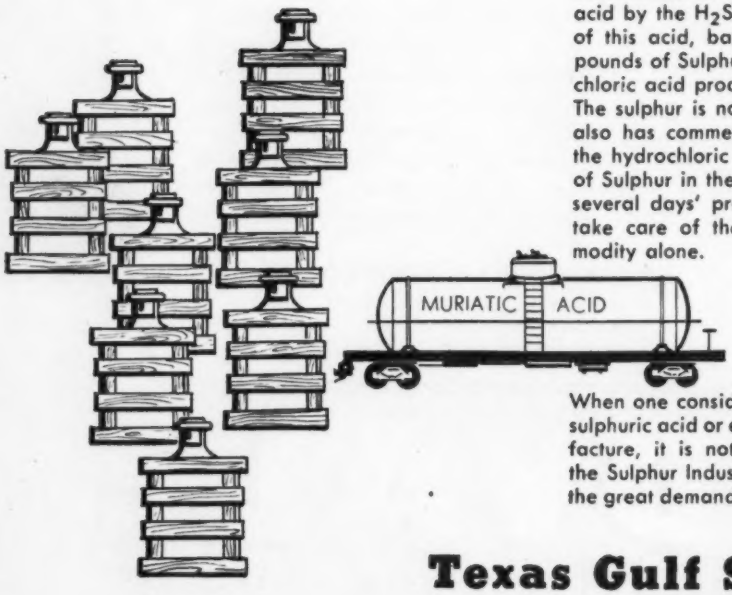


Loading a ship with Sulphur at Galveston

Thousands of tons mined daily, but where does it all go?

PARAPHRASING an old saying: 'It takes a chemical to make a chemical,' certainly applies to hydrochloric acid.

No chemical engineer has to be told how hydrochloric acid is made but sometimes with the mind focussed on the word "hydrochloric" little thought is given to another word "sulphuric." It is this word that calls attention to the fact that to make one net ton of 20° Bé hydrochloric acid by the H_2SO_4 process requires about 950 pounds of this acid, basis 100%, which is equivalent to 320 pounds of Sulphur. About one third of the annual hydrochloric acid production is made by the use of sulphuric. The sulphur is not lost because salt cake, a by-product, also has commercial value. But any way you figure it, the hydrochloric acid industry is an important consumer of Sulphur in the form of sulphuric acid. In fact, it takes several days' production from all the Sulphur mines to take care of the annual production of this one commodity alone.



When one considers all the other chemicals that require sulphuric acid or other Sulphur compounds for their manufacture, it is not difficult to appreciate how faithfully the Sulphur Industry is serving industry today in spite of the great demands made upon it.

Texas Gulf Sulphur Co.

75 East 45th Street, New York 17, N. Y.

Mines: Newgulf and Moss Bluff, Texas

gases from pulp stock suspensions, Forrest Freeman and John D. Boadway, Consolidated Paper Corp. Ltd., stated that the gas existing as bubbles in pulp stock is objectionable in papermaking due to its tendency to float and flocculate fiber and pitch. To make sure, however, that there is no further chance of bubble formation it is necessary to remove a large portion of the total gas in the stock. This is achieved by spraying into an evacuated tank, or by the newer method of gas removal with a modified Vortrap.

F. W. Boughton and K. J. MacKenzie, Eastman Kodak, discussed the advantages of using aluminum chloride in place of aluminum sulfate for precipitating the beater size when using melamine resin, despite the fact that the price of aluminum chloride is several times greater than that of aluminum sulfate. A considerable saving in paper manufacturing costs may be realized when using aluminum chloride because it permits a drastic reduction in the melamine resin furnish without loss of wet strength.

N. S. Gruenhut, Stein Hall & Co. Inc., presented a theory for the mechanism of retention of mannangalactan gums by paper fibers. The speaker suggested that a linear gum will align itself to the thread-like cellulose molecule and be absorbed on the surface while the more branched modified gum molecule, due to crosslinking, will be anchored more securely within the cellulose molecule in addition to being absorbed on the surface.

Research and Progress Linked Together, Abrams Tells Tappi Luncheon

PROGRESS IN THE PAPER industry is a story of constant research, of curiosity on the part of young men who are guided only by the constant need for better products, according to Allen Abrams, vice president of Marathon Corp. Mr. Abrams addressed the annual luncheon that closed the national Tappi convention in New York, N.Y. The gathering was held in the grand ballroom of the Commodore Hotel.

Tracing the history of papermaking from the crude stone tablets of earliest times to the most modern developments in fourdriniers, the speaker emphasized the trial and error of the many men who devoted their lives and inventive genius to finding better methods of paper manufacture. It was civilization's constantly growing need for paper and paper products, he said, that spurred these men to their greatest endeavors.

Medal to Griffin

Featured at the luncheon was the annual presentation of the Tappi Medal, which this year went to Roger C. Griffin, formerly of Arthur D. Little Inc. and at one time chairman of Tappi's Standards Committee. The presentation was made by James d'A. Clark of Tappi; the award was accepted by Roger C. Griffin Jr. for his father, who was unable to attend.

Chairman of the session was Kenneth P. Geohegan of Howard Paper Mills, the outgoing national president. He turned the gavel over to George Pringle of the Mead Corp., his successor, for adjournment.

Constant research

"Seldom can contemporaries assess adequately the age in which they live," Mr. Abrams told the Tappimen. "Even so, we shall recall changes brought about by research in our own industry, particularly in the past half century. In these years we have become better acquainted with our prime raw material, wood—recognizing it as a inexhaustible resource if properly harvested and renewed. We are planning how to plant trees properly, to double our cellulose yield with new species, to employ former weed trees, to use our waste wood and lignin. Through fundamental researches . . . on cellulose and lignin we know how to make stronger, whiter pulps; with cellulose we have built new industries such as cellophtane, rayon, and nitro-cellulose; we have developed chemical products of lignin for drilling oil wells, tanning leather, conditioning boiler water, making yeast, and flavoring ice cream. . . . We have designed new equipment and accelerated our paper machines to 30 miles per hour.

". . . All this has been brought about by the combined efforts of the man who dreams and the man who executes. . . . Most research men would prefer to have their contributions judged by the general health and progress of their companies and their industry. They urge that we have more fundamental fact finding, without relation to any specific objectives, because out of these apparently purposeless investigations have come some of our greatest discoveries. . . . You young men should become better acquainted with the tree . . . look with a critical eye at the methods and equipment for manufacturing pulp and paper.

Maine, Syracuse Alumni Gather to Honor Prof. C. E. Libby

ALUMNI OF BOTH the New York State College of Forestry and the pulp and paper department of the University of Maine gathered at the Roosevelt Hotel in New York, N.Y., February 18 to pay tribute to Prof. C. Earl Libby.

A graduate of Maine, Professor Libby recently retired as head of the pulp and paper department at Syracuse. He has joined the staff of the North Carolina State College at Raleigh, where he is initiating a course in pulp and paper technology.

Professor Libby was introduced to the gathering by Everett K. Mansfield, president of Ellis Paper Board Products of Portland, Maine, who was a classmate of Professor Libby. The alumni were welcomed by Marsden C. Hutchins for Maine and Clark E. Snook for Syracuse. Mr. Snook replaced Lionel M. Sutherland, who had been detained in Europe on business. Mr. Hutchins and Mr. Snook are chairmen of their respective alumni groups.

Presentations to Professor Libby included the Maine Honor Award for "outstanding service to our industry." It was given by J. L. Ober, vice president of Scott Paper Co., representing the University of Maine Pulp & Paper Foundation.

William R. Willets of Titanium Pigment Corp., representing Syracuse, presented Professor Libby an autograph album containing the signatures of many of his pupils at Syracuse. He also presented the guest of honor with a four-volume work on the handmade papers of Japan and an open travel order for him to use as he wishes.

HONOR AWARD of the University of Maine is presented to Prof. C. Earl Libby (right) by J. L. Ober, vice president of Scott Paper Co.; the ceremony took place during the joint Maine-Syracuse luncheon

A graduate of Maine in 1916, Professor Libby was employed by R. A. Pettengill Co. from 1916 to 1917; Aetna Explosives Co., 1917-1919, and Bayless Paper Mfg. Co., 1919-1920. He joined the Syracuse College of Forestry in 1920, becoming head of the pulp and paper department in 1932.

Divisional Meetings Held During APPA Convention

AFFILIATED GROUPS and divisional associations held extensive meetings during the four days of the national APPA meeting at New York's Waldorf-Astoria Hotel. Yearly elections of officers were announced and reports on the activities of the past year presented. Many of the organizations also held extensive discussions on their particular problems of manufacture and distribution, while headline speakers from government and industry alike were heard.

Writing Paper Manufacturers Association

A. C. Remley of Nekoosa-Edwards Paper Co. was elected president of the Writing Paper Manufacturers Association at its 92nd annual meeting. He succeeds Bruce Crane of Crane & Co.

J. H. Goodwin of International Paper Co. was re-elected vice president and chairman of the sulfite bond group. Hale Holden of Byron Weston Co. was re-elected vice president and chairman of the rag content paper group. G. E. O'Connor of Mohawk Paper Mills Inc. was chosen as representative on the APPA board of governors, with Mr. Holden as alternate representative. M. C. Dobrow was again named secretary-treasurer. John F. Darrow is assistant secretary, and Miss Olive F. McGill assistant treasurer.

Members of the executive committee representing the rag content paper group chosen at the meeting were: Mr. Holden, chairman; F. R. Andrews, Esleeck Mfg. Co.; M. D. Bardeen, Lee Paper Co.; F. N. Bridgham, Strathmore Paper Co.; T. M. Gilbert, Gilbert Paper Co.; F. E. May, Rising Paper Co.; E. C. Reid, American Writing Paper Corp.; L. O. Schubart, Neenah Paper Co., and William Whiting, Whiting Paper Co.

Executive committee members representing the sulfite bond group are: Mr. Goodwin of International, chairman; H. H. Holden, Eastern Corp.; W. L. Jennings, West Virginia Pulp & Paper Co.; H. W. Kampf, the Mead Corp.; A. G. Sharp, Kimberly-Clark Corp.; David Smith, Wausau Paper Mills Co.; H. W. Suter Jr., Champion Paper & Fibre Co.; W. B. Zimmerman, Howard Paper Mills Inc., and J. D. Zink, Hammermill Paper Co.

National Council for Stream Improvement

"Industry is faced with the prospect of meeting requirements for stream improvement of agencies on several levels, including state, interstate, federal and international," according to George E. Dyke, re-elected chairman of the board of governors of the National Council for Stream Improvement. Addressing the board's annual meeting, Mr. Dyke noted the rapid progress in pollution abatement by the pulp and paper industry and stated that, even though production of paper and paperboard had almost doubled in the past 10 years, stream pollution by the industry as a whole had decreased.

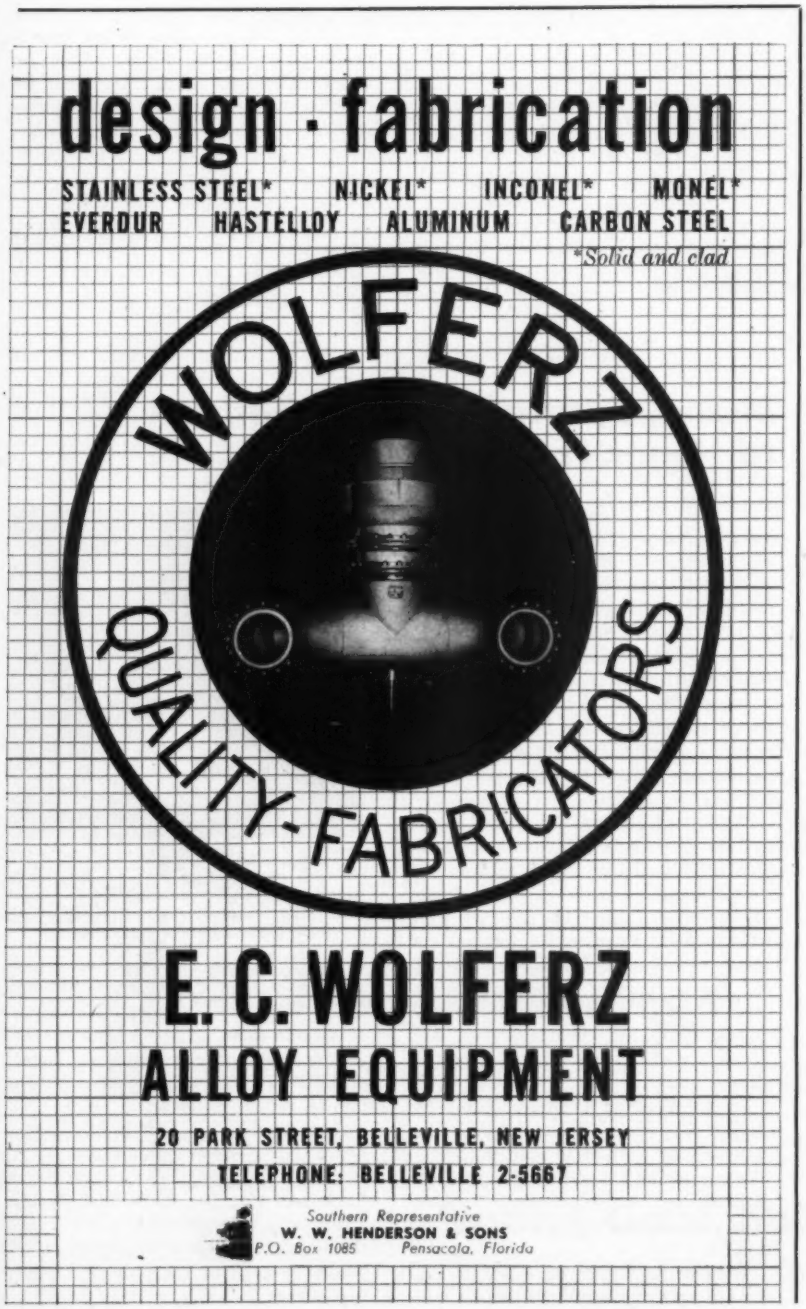
Other officers of the National Council are as follows: Clyde B. Morgan of Rayonier Inc. and W. Irving Osborne Jr. of Cornell Paperboard Products Co., vice chairmen; J. D. Zink of Hammermill Paper Co., treasurer. Russell L. Winget is executive secretary and assistant treasurer.

Sulphite Paper Manufacturers Association

1953-54 officers: Donald F. McCall, Racquette River Paper Co., general chairman; James G. Conley, Fraser Paper Ltd., vice chairman bleached group; George Stuhr, Southern Kraft Division of International Paper Co., vice chairman unbleached group; Wayne A. Brown, Crown Zellerbach Corp., vice chairman manila group; Neil E. Nash, Nekoosa-Edwards Paper Co., vice chairman machine glazed group, and Gilford F. Henderson, Brown Co., vice chairman bleached converting group.

Kraft Paper Association

Walter C. Shorter of Camp Mfg. Co. was elected president. He succeeds Wayne A. Brown of Crown Zellerbach Corp. H. S. Daniels of Union Bag & Paper Corp. was made vice president. New members of the executive committee are: L. W. Gould of



Gaylord Container Corp. and J. C. Hair of Crossett Paper Mills.

Paper Napkin Association

New officers: B. T. Hoffmaster of Hoffmaster Paper Co., chairman; R. L. Fenstamaker of C. A. Reed Co., vice chairman, and L. W. Moore of Crown Zellerbach Corp., James Asmuth of Wisconsin Tissue Mills, Frank Feinberg of Sweet Tissue Co. Inc., L. R. Watson of The Tuttle Press Co., Irwin Zuckerman of Hudson Pulp & Paper Corp. and Robert Bertram of Marathon Corp., members of the executive committee.

Groundwood Paper Manufacturers Association

Robert Faegre of Minnesota & Ontario Paper Co. was elected president; Samuel Pruyn of Finch, Pruyn & Co. Inc., eastern vice president, and Andrew G. Sharp of Kimberly-Clark Corp., western vice president. The members of the board of governors at large are James G. Conley of Fraser Paper Ltd., Edward J. Doonan of Gould Paper Co., Paul A. Mahony of International Paper Co., and Robert E. Canfield, secretary-treasurer.

Tissue Association

William Servotte of Bay West Paper Co. was elected president. Others elected were Wayne Brown of Crown Zellerbach Corp., vice president; R. W. Sweet of Sweet Bros., treasurer, and Ross Fife, executive secretary. James Suter of Roundout Paper Mills was named to head the wrapping tissue group; Howard Gorten of Dennison Mfg. Co., the gift wrapping group; Guilford Henderson of Brown Co., the paper towel group, and Mr. Brown, the toilet paper group.

Coated and Processed Paper Association

At the group's annual meeting, Lawrence R. Clark of Hampden Glazed & Card Co. was elected president. Newly elected members of the executive committee include Louis C. Krauthoff of H. D. Catty Corp.; Leonard A. Schulman of Kupfer Bros.; Spurgeon F. Brandt of Wyomissing Glazed Paper Co., and William B. Snow of Middlesex Products Corp. Arthur A. Thomas was re-elected executive director and secretary-treasurer.

Soda Pulp Manufacturers Association

Peter Paine of New York & Pennsylvania Co. was re-elected chairman. Other officers reappointed were Amor Hollingsworth of Penobscot Chemical Fibre Co., vice chairman, and George Vogel of the Mead Sales Co., secretary-treasurer.

United States Pulp Producers Association

Regional directors for 1953-1954 are: Downing P. Brown of Brown Co., New England; D. S. Leslie of Hammermill Paper Co., Middle Atlantic; Stuart E. Kay of International Paper Co., South; Lyall Stilp of Kimberly-Clark Corp., Lake States, and L. K. Larson of Weyerhaeuser Timber Co., West Coast.

Directors at large are: R. M. Buckley of the Soundview Division of Scott Paper Co.; A. Calder Jr. of Union Bag & Paper Corp.; B. R. Cancell of Rhinelander Paper Co.; C. H. Conrad of Rayonier Inc.; Willard J. Dixon of St. Regis Paper Co.; Walker Hamilton of Riegel Paper Corp.; Amor Hollingsworth of Penobscot Chemical Fibre Co.; James L. Madden of Hollingsworth & Whitney Co.; George Olmstead Jr. of S. D. Warren Co.; John Stevens Jr. of Marathon Corp.; Lawrence W. Strattner of West Virginia Pulp & Paper Co.; G. J. Ticoulat of Crown Zellerbach Corp.; Lawson Turcotte of Puget Sound Pulp & Timber Co., and H. E. Whitaker of the Mead Corp. James L. Ritchie continues as executive director.

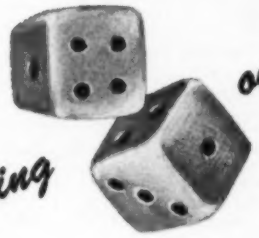
Association of Pulp Consumers

David Knowlton of Knowlton Bros. was re-elected president, with Carlton W. Smith of Moraine Paper Co. vice president. Reed R. Porter is secretary-treasurer. Five new directors are: Nathan H. Bergstrom of Bergstrom Paper Co.; Earl E. Grant of Crystal Tissue Co.; Francis Kiefer of Port Huron Sulphite & Paper Co.; George E. O'Connor of Mohawk Paper Mills Inc., and Lane Taylor of W. C. Hamilton & Sons Inc.

Newsprint Service Bureau

1953-54 officers include G. E. Young of Crown Zellerbach Corp., president; A. G. Wakeman, of Coosa River Newsprint Co., vice president, and John J. Zima, secretary-treasurer.

The board of directors is composed of the following: C. E. Braun of Publishers' Paper Co.; M. C. McDonald of Great Northern Paper Co.; R. O. Sternberger of Hearst



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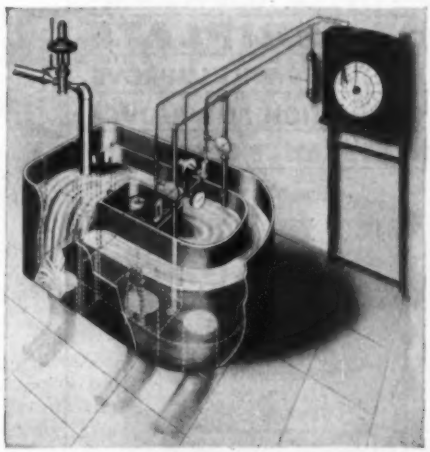

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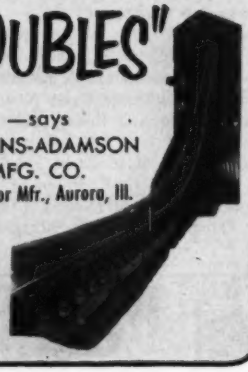

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Publishing Co., Pejepscot Paper Division; John T. Hobson of St. Croix Paper Co., and R. W. Wortham Jr. of Southland Paper Mills Inc.

Glassine and Greaseproof Manufacturers Association

Paul F. Moore of Westfield River Paper Co. was re-elected chairman of the executive committee. Newly elected to the committee was Walter L. Dawson of Hamersley Mfg. Co. He replaces Arthur Schwab, also of Hamersley.

Blotting Paper Manufacturers Association

At the annual meeting Paul H. Travis of Rochester Paper Co. was re-elected president. Other officers who were re-elected were: Graham A. Carlton of Standard Paper Mfg. Co., vice president, and Eric C. Lagerloef, secretary-treasurer.

Technical Section of C.P.P.A. Discusses Potentials for Integrated Basic Research

THE THIRTY-NINTH annual meeting of the Technical Section of the Canadian Pulp & Paper Association drew 1,066 delegates to a series of meetings and discussions which, among others, included an evaluation of the potentials for integrated basic research conducted by industry, research institutes, and the Canadian universities.

The Technical Section's Fundamental Research Committee had prepared a leaflet in 1952 acquainting the Canadian universities with the problems in pulp and paper research, and it was as a direct result of this circular that the Section, various research organizations, and universities compared notes at this meeting on what is being done and what can be done on research that would benefit the pulp and paper industry.

Executive council for 1953

The election of the sections' 1953 executive council was announced as follows: R. L. Fraser, assistant production manager, Abitibi Power & Paper Co. Ltd., is chairman of the Section. J. B. Jones, assistant manager of manufacturing, The Ontario Paper Co. Ltd., is vice-chairman.

The counselors for 1953 are: Dr. W. Gallay, director of research, E. B. Eddy Co.; J. R. W. Grieve, superintendent, Brown Corp.; W. E. Soles, director and general manager, Anglo-Canadian Pulp & Paper Mills Ltd.; G. F. Allo, manager of box board department, Bathurst Power & Paper Co. Ltd.; W. S. Cramp, resident manager, St. Lawrence Corp.

Annual awards

The I. H. Weldon Gold Medal was presented by its donor, A. L. Dawe, Consolidated Paper Sales Ltd., to E. Langins, research chemist, Bowater's Newfoundland Pulp & Paper Mills Ltd., for his paper on pulp studies.

The Technical Section's Service Award, a bronze medal and citation, was presented by R. L. Weldon, Bathurst, to John Eyton, electrical engineer of Abitibi for his work in organizing the Section's electrical engineering committee.

The C. Howard Smith Gold Medal went to J. L. Horton, chief chemist, Pulp and Paper Division, Diamond Match Co., for his paper on the preparation of sulfite pulp using an ammonia base cooking liquor.

The Safest Mill in Canada contest, sponsored by *Pulp and Paper Magazine of Canada*, was won by Gaspesia Sulphite Co. and the Fort William mill of Abitibi.

E. J. Thom, chairman of the Mechanical Pulp Section, reported a record groundwood pulp production of 4.8 million tons in 1952. While the mills used 10 per cent more pulp than in 1951, Mr. Thom said, the production of groundwood pulp for other than newsprint purposes was down 15 per cent and shipments were down 19 per cent. Of the total groundwood pulp production, 73 per cent was shipped to the United States.

With an output of 3.6 million tons of chemical wood pulp in Canada in 1952, production was 7 per cent lower

R. M. Fowler

R. L. Fraser

P. R. Sandwell

Percy M. Fox

than in 1951, said C. M. Matheson, chairman of the Chemical Pulp Section. Of the chemical pulps only news-grade unbleached sulfite pulp had held its 1951 level, while bleached sulfite pulp output was somewhat higher than in 1951. Mr. Matheson said that Scandinavian and European pulp producers by an aggressive sales policy had managed to divert some tonnage away from Canadian sources of supply.

According to a report by E. Norval Hunter, chairman of the Specialty Papers Section, the demand for Canadian specialty papers had fallen off in 1952, particularly in the second and third quarters of the year. The market, however, had picked up again toward the close of the year.

F. F. Arnoldi, chairman of the Board Section, reported that, with an estimated output of 684,000 tons in 1952, the production of paperboard in Canada was about 10 per cent below the 1951 level. Demands for boxboard grades had increased considerably in the last quarter, and prospects for these grades continue good for the first quarter of 1953. Canadian paperboard mills, according to Mr. Arnoldi, had increased their capacity for container board by 30,000 tons and for boxboard by 34,000 tons in 1952.

Canadian wrapping paper mills operated at 87 per cent capacity in 1952 and produced a total of 225,000 tons, according to R. V. Hall, chairman of the Wrapping Paper Section.

The 1952 production of fine papers was down 12 per cent compared with the 1951 output, said G. M. Brain, chairman of the Writing and Coated Papers Section.

J. B. Matthews, chairman of the Woodlands Section, reported on the 1952 activities of his section and listed such investigations as aerial surveys, nutrition, camp heating, rail transportation of pulpwood, cutting tools, labor training and turnover, fire prevention, mechanical hauling of pulpwood, and silviculture.

A report of the Western Division, presented by Harold S. Foley, disclosed that the pulp and paper industry in British Columbia, consisting of 10 companies and 13 mills, produced more than 1,250,000 tons of pulp and paper products in 1952. This figure is almost three times the annual tonnage produced a decade ago. The opening of the Elk Falls Co. newsprint mill at Duncan Bay and an advance in the research project on the chemical barking of trees, which is undertaken in cooperation with the British Columbia Forest Service, marked the 1952 highlights in the British Columbia pulp and paper industry, said Mr. Foley.

In his annual report Douglas Jones, executive secretary of the Technical Section, reviewed the accomplishments

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of the Section since 1915, when it was founded, while H. C. Lee, Canadian International Paper Co., the outgoing chairman, reviewed the Section's 1952 activities.

R. L. Fraser, Abitibi, the Technical Section's 1953 chairman, announced that the summer meeting will be held at Saranac Lake, N.Y., on June 4-6. This will be the first meeting of the Technical Section held outside Canada.

Stadler Memorial Lecture

The first annual John Stadler Memorial Lecture, entitled "Papermaking in the Second Industrial Revolution," was presented by P. R. Sandwell, Sandwell & Co. Ltd.

Referring to the age of plastics, light metals, jet propulsion, nucleur fission, and thinking mechanisms as the second industrial revolution, Mr. Sandwell suggested that these developments called for moderately-sized mills, using light automatic equipment arranged as far as possible for outdoor operation. To build a newsprint mill of contemporary design and economic size requires an investment in physical assets and working capital of over $50,000,000, Mr. Sandwell said. In respect to raw materials, sources of energy, finance, and marketing, new paper mills of contemporary design are by their size not in line with what is needed, he continued. He envisaged the paper mill of the future as consisting of a collection of light, continuous and automatic equipment, properly insulated and automatically controlled, for outdoor operation.

Progress in basic research

C. C. Heritage, Weyerhaeuser Timber Co., and J. L. McCarthy, University of Washington, presented a broad review of the possibilities of wood as a chemical raw material and drew attention to the limitations of the available methods of wood analysis.

Examining these limitations in somewhat greater detail, Dr. C. B. Purves, McGill University, focused attention on current analytical methods for holocellulose, Klason lignin, alpha, beta and gamma cellulose. He discussed the uncertainty of the position of the borderline between lignin and holocellulose, and also the uncertainty of its chemical union. Investigations carried out at McGill by Yan, Neubauer, Milford, and Milka have produced indecisive results. If such a union exists, Dr. Purves stated, it is probable that it accounts for very little of the wood.

In swelling wood with anhydrous liquid ammonia and then extracting hemicelluloses with water, Milford and Milka had come out with two general observations: (1) hemicelluloses so isolated are contaminated with considerable amounts of pectic materials, and (2) the hemicelluloses in the original wood are transesterified to three-dimensional structures.

Discussing wood carbohydrates, R. J. Howard, Industrial Cellulose Research Ltd., stressed the importance of wood carbohydrates, since they constitute the most widely distributed and cheapest natural polymer. Moreover, cellulose, he said, is inherently far stronger than concurrent man-made polymers. Wood carbohydrates in the not too distant future, he predicted, will become the basic raw material for the organic chemical industry.

Mr. Howard then listed a number of urgently needed investigations, such as (1) improvement of present day commercial yield of carbohydrates from wood, (2) a study of the carbohydrate components in typical paper and dissolving pulps, (3) a study of how environmental factors affect the production of carbohydrates in trees, (4) a study of the reaction of wood carbohydrates during the sulfite cooking process, (5) a better understanding of the reaction between wood carbohydrates and caustic soda, (6) a thorough study of the reaction of water with carbohydrates.

Discussing the challenge of lignin, Dr. Borden Marshall, Ontario Research

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Foundation, drew attention to the potential production of lignin in Canada and the United States from pulping waste alone, which he estimated at approximately 8,000,000 tons annually. In Canada, 2,000,000 tons of waste sulfite liquor solids are available annually as a potential raw material. These waste solids are composed of 1,300,000 tons calcium lignin sulfonate, 300,000 tons fermentable sugars, 100,000 tons of nonfermentable sugars, and 300,000 tons of miscellaneous organic and inorganic compounds.

Sugar-free lignin sulfonates, Dr. Marshall continued, have remarkable dispersing properties and can be used by the cement industry to increase the fluidity of the wet mix and thus decrease the amount of water required. Since the strength of the concrete varies inversely with the amount of water added, the addition of lignin produces a stronger product. Lignin dispersing agents are used to improve the strength of bricks and other ceramic products. They are also used to prevent boiler scale, in drilling oil wells, and as partial replacement of natural tannins.

Discussing the production of chemicals from lignin, Dr. Marshall mentioned vanillin as the only pure chemical made from lignin at the present time. The new vanillin process involves the alkaline air oxidation of waste sulfite liquor. While vanillin is used principally as a flavoring agent, it is almost an ideal raw material for the synthesis of many useful organic compounds, particularly in the pharmaceutical, perfume, and plastic fields.

Among other methods of producing chemicals from lignin are: (1) hydrogenation of lignin at very high pressures, which yields propyl cyclohexanol derivatives, and (2) heating waste sulfite liquor with alkali at high temperatures in the presence of alcohol which results in the formation of catechol.

In Canada approximately 6,000,000 gallons of alcohol are produced from about 13 per cent of the waste sulfite liquor available.

Technical papers

Three papers were presented on the use of the betameter in the pulp and paper industry. D. C. Brunton, Isotope Products Ltd., described the operation and use of the beta ray gauge in the paper industry for measuring the weight and profile of the web of paper. This gauge tells the papermaker if the weight of the forming sheet of paper is remaining constant, and it also measures the profile of the sheet of paper to assist in controlling uniformity. G. E. Wilson, Don Valley Paper Co. Ltd., described the use of the betameter at a wet end to control the quality of paper in the papermaking process. The betameter thus installed records the mass of the sheet as it moves along to the dryers and automatically adjusts the control on the pulp stock moving on to the machine to correct the variation in weight. The third paper on automatic control with the betameter was presented by J. Y. Chartrand and A. Richer, Rolland Paper Co.

New type of pulpers and pulper-refiner equipment, such as the aqua-pulper and betapulper, were described by H. D. Cook of Sweet Bros. Paper Co. Inc.

J. M. Franklin, Bowater's Newfoundland, urged the application of automatic control thinking in the operation of all processes in the pulp and paper industry and suggested that pulp and paper may become a by-product of the cellulose industry within a decade, a conversion in which instrumentation is going to play a leading part.

The effectiveness of high-load grinding was discussed by A. J. Winchester, Donnacona Paper Co. Ltd., and A. M. Cuthbertson, Abitibi. The discussion was based on the replies to a circulated questionnaire. While opinions varied on whether high-load grinding is a satisfactory way to increase groundwood pulp production, most of the mills were

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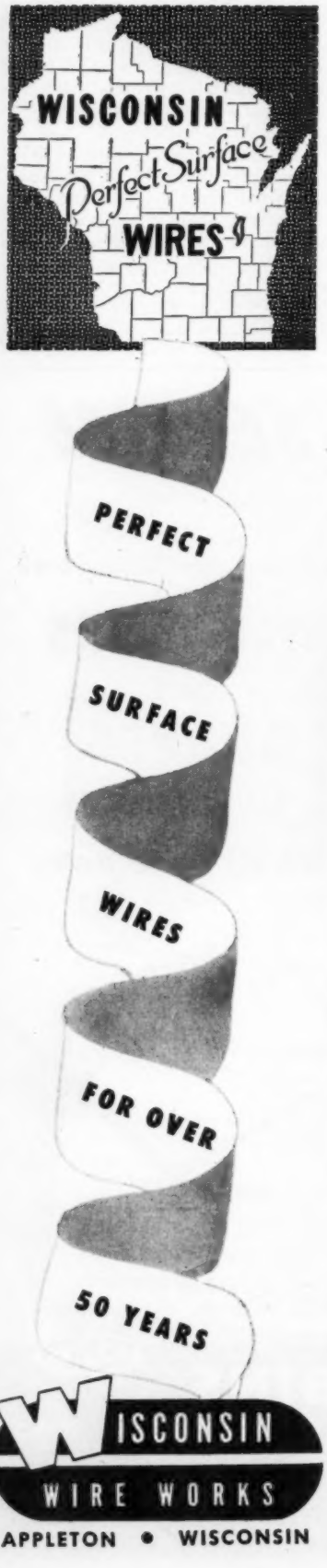

skeptical about the resulting pulp quality.

J. L. Horton of Diamond Match described their trial run of making pulp for tissue papers using ammonia base cooking liquors and both softwoods and hardwoods. The results, after a trial run of 23 days, showed that the cooking time could be reduced one hour; higher pulp yields were obtained using the regular mixture of hardwoods and softwoods, and the output was increased by at least 10 per cent. With softwoods the ammonia base pulps were equal in quality to the calcium base pulps, while with hardwoods, or a mixture of softwoods and hardwoods, the ammonia base pulps were superior in quality.

Four papers were presented on heat and chemical recovery after the furnace in alkaline pulp mills. E. M. Reed, Marathon Paper Mills of Canada Ltd., discussed direct contact evaporators; J. A. Allan, Canada Paper Co., reviewed the operation of the Tomlinson Secondary Recovery System, and C. V. Callaghan, Bathurst, described the Venturi Scrubber at Bathurst. W. A. Thompson, Coppers Co. Inc., described the installation of an electro-filter in a 250-ton recovery furnace of a kraft mill in the southern United States. The electrofilter, he said, is durable, requires little maintenance.

The use of stainless steel by the Swedish pulp industry was described by E. Gunnar Lindh of the Sandvik Steel Co. The Swedish industry, he said, has used acid-resistant steels with success for many years, and Swedish circulating systems using these steels are installed in about 550 pulp digesters throughout the world.

A method of removing gas from the pulp stock was described by Horace Freeman and John D. Boadway, Consolidated Paper Corp. Ltd. This was achieved by redesigning the Vortrap and using it together with a vacuum pump, thus removing dirt and dissolved, absorbed, and free gas bubbles in one operation. Gas hinders the pulp fibers from uniformly felting into paper on the machine.

PALLETS and their use in the paper industry were discussed at the Chicago Tappi meeting by Ray Frase of Addison-Semms (standing); others in the picture are (l to r) Charles Krebs of Atlas Boxmakers; J. J. McIntyre of H. B. Fuller Co.; E. C. Berg of Acme Carton, and C. S. MacNair of Acme Steel Co.

Chicago Tappi Hears Talk on Palletizing

Palletizing in the paper industry was the subject of an address given January 19 by Ray Frase of Addison-Semms Corp. at the regular meeting of the Chicago Section of Tappi. Charles Krebs of Atlas Boxmakers was in charge of the program, while E. C. Berg of Ace Carton Co. introduced the speaker.

Mr. Frase pointed out that the expendable paper pallet, a low-cost lightweight packaging medium for unit loading, was a result of wartime demands. He stated that the pallet is capable of supporting up to 30,000 lb. per 9 sq. ft. Discussing materials, the speaker declared that a good pallet can be made from most any kind of board, but that it has been found that corrugating gives the best results. The pallet is built-up columns of fluted single-faced board convolutely wound and glued. These columns are glued to double-wall corrugated medium for the pallet deck. Columns are designed to support individually 3,000 lb. minimum compression. An 8-inch column with a 4-inch core will support 10,000 lb. compression. The placing of columns under the deck must be adjusted to the types of lifting equipment in the field, Mr. Frase stated. He explained that Addison-Semms, Racine, Wis., works closely with lifting equipment manufacturers on this problem.

A bottom runner joining the posts gives more strength to the finished unit, particularly to a buckling strain. A double-decked pallet, the speaker continued, gives even more strength. Proper application of banding, he said, is necessary for correct loading in boxcars.

Motion pictures were shown of typical palletized units on the job. Applications ranged from paper in the sheet and roll through washing machine tubs, automobile radiators, ammunition, and even 4,000 lb. loads of lead metal. A question-and-answer period followed the talk.

Coming Events

TAPPI meetings

May 22-23—Pacific Section, joint meeting with the Pacific Coast Division of the Superintendents Association, Gearhart Hotel, Gearhart, Ore.

May 25-27—Fourth Coating Conference, Netherlands Plaza Hotel, Cincinnati.

American Pulp & Paper Mill Superintendents Association meetings

April 16—Michigan Division, Hotel Harris, Kalamazoo.

April 23—Miami Valley Division, American Legion Hall, Middletown, Ohio.

May 8-9—Northwestern Division, Dell View Hotel, Lake Delton, Wis.

May 15-16—Pennsylvania-New Jersey-Delaware Division, Hotel Stacy-Trent, Trenton, N.J.

May 21—Michigan Division, Hotel Harris, Kalamazoo.

May 22-23—Pacific Coast Division, joint meeting with the Pacific Coast Section of Tappi, Gearhart Hotel, Gearhart, Ore.

June 9-11—National meeting, Atlanta-Biltmore Hotel, Atlanta, Ga.

Other meetings

March 25-27—Woodlands Section, CPPA, 35th annual meeting, Mount Royal Hotel, Montreal.

March 26-28—Pacific Coast Branch, Technical Section, CPPA, spring meeting, Harrison Hot Springs Hotel, Harrison Hot Springs, B.C.

March 26-27—CPPA, Western Division, First Aid Contest and Labor-Management Safety Council, Hotel Vancouver, Vancouver, B.C.

April 14-16—Conveyor Institute, University of Illinois Department of Engineering and the Conveyor Equipment Manufacturers Association, Illini Union Building, Champaign, Ill.

April 20—Packaging Institute, annual spring luncheon, Furniture Club, Chicago.

April 21—Association of Consulting Chemists and Chemical Engineers Inc., symposium and dinner, Hotel Belmont-Plaza, New York, N.Y.

April 26-29—American Institute of Chemical Engineers, joint meeting with the Chemical Engineering Division of the Chemical Institute of Canada, Royal York Hotel, Toronto.

May 18-20—National Paperboard Association, spring meeting, Santa Barbara Biltmore Hotel, Santa Barbara, Cal.

June 4-6—CPPA, Technical Section, Saranac Inn, Saranac Lake, N.Y.

June 4-6—Chemical Institute of Canada, 36th annual conference, Windsor, Ont.

June 15-17—Forest Products Research Society, 7th Annual National meeting, Memphis, Tenn.

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The Paper Industry Names in the News

R. A. Nugent

Dr. C. M. Sigvardt

Dr. T. A. Pascoe

Dr. H. W. Rowe

Nekoosa-Edwards Promotes Six

Promotions affecting six key men in the manufacturing and technical departments have been announced by Nekoosa-Edwards Paper Co., Port Edwards, Wis.

RICHARD A. NUGENT has assumed new responsibilities consisting of planning with particular regard to expansion and improvement of facilities in both the Port Edwards and Nekoosa mills. Mr. Nugent, a graduate of the University of Michigan and at one time director of research at Celotex Corp., has been with Nepco since 1928. He has been manufacturing superintendent of the Nekoosa mill since 1947.

DR. CHARLES M. SIGVARDT, technical superintendent at Nekoosa for more than a year and a half, becomes general superintendent at the Nekoosa mill. He assumes all the responsibilities formerly held by Mr. Nugent. Dr. Sigvardt received his degree at the Institute of Paper Chemistry, Appleton, and before joining the Nepco staff had been with Scott Paper Co. and Celotex.

Effective February 16, *DR. TRUMAN A. PASCOE* became research director. *DR. HERBERT W. ROWE* was named technical director. Dr. Pascoe, director of research and technical director at Northwest Paper Co. from 1930 to 1936, will devote his attention to various research problems and will be available for consultation on all phases of technical activities. Dr. Rowe, also a graduate of the Institute, will supervise laboratory personnel and will be responsible for the administration of the technical department.

ED WEINFURTER, a veteran of 34 years in the Nekoosa mill, was promoted from general foreman to operating superintendent. *ART BERNHARDT*, a chemical engineer in the Nekoosa kraft mill since early last year, has been named assistant superintendent of the pulp mill.

Marathon Changes Announced by Foley

Three transfers of Marathon Corp. personnel were announced recently by Norman H. Foley, Menominee, Mich., plant manager. New project engineers at Menominee are *JAMES R. KOCHA* and *MARTTI A. LUNDSTROM*, both from the firm's Menasha, Wis., plants. *ROBERT H. WOODS* of Menominee has been transferred to Menasha as maintenance engineer at the wax paper plant. Mr. Foley also announced the resignation of *VERNOR E. WARE JR.*, as Menominee plant engineer.

Mr. Kocha before his recent transfer was maintenance engineer at Menasha. Prior to joining Marathon he was with Pratt & Whitney Aircraft. Mr. Lundstrom came to Marathon in 1948 as maintenance engineer at the Menasha parafilm plant. Mr. Woods became associated with the firm in 1947, going to Menominee in 1951 as project engineer.

Kalamazoo Paper Names Wise President

JAMES A. WISE, associated with the firm since 1930, was recently elected president of Kalamazoo Paper Co., succeeding George T. Jubb, who has requested that he be relieved of his duties as general manager. Mr. Jubb will remain in an advisory capacity.

A native of Kalamazoo, Mr. Wise was named executive vice president and general manager in July of 1951. He is a graduate of Yale University and began his career in the paper industry with Bryant Paper Co., now a division of St. Regis. In 1930 he joined Kalamazoo Paper, where he advanced through the production departments to the post of general superintendent. In 1942 he was made vice president for production and became a member of the board of directors.

Kerridge Given Riegel Vice Presidency

R. L. KERRIDGE has been elected vice president of Riegel Paper Corp. He joined the firm in 1934, and after two years at the mills in New Jersey he became secretary to John L. Riegel. In 1945 he was appointed assistant to the general superintendent of the Milford mill and later became manager of the Riegelsville, Hughesville and Warren mills. He was made assistant to the president in 1951 and will continue to hold this post. Mr. Kerridge has been a director of the corporation since 1950.

R. L. Kerridge

Fred O'Neil

Fred O'Neil Succeeds Libby at Syracuse

PROF. FREDERIC W. O'NEIL has been named head of the department of pulp and paper technology at the College of Forestry of the State University of New York, Syracuse. He succeeds Prof. C. Earl Libby, who retired in July after 32 years' service at the college. Prof. Libby now heads a new curriculum in pulp and paper at the School of Forestry, North Carolina State College of Agriculture and Engineering.

A native of Yonkers, N.Y., Professor O'Neil received his M.S. at Syracuse in 1935. He was with the research department of Hooker Electrochemical Co., Niagara Falls, for two years before joining the Syracuse faculty as an instructor in 1937. He was promoted to

assistant professor in 1943, associate professor in 1945, and professor in 1951. Professor O'Neil has been acting department head since Professor Libby's retirement.

In 1946 he was named assistant director of a hardwood pulping project jointly sponsored by the College and Empire State Paper Research Associates Inc. He has directed the project since last July. The project developed the chemigroundwood process of pulping hardwoods, first announced in 1950.

In another change at the College, *GORDON M. MOULDS* of McMasterville, Que., has been appointed instructor in pulp and paper technology. He received his B.Sc. degree from McGill University in 1948 and is now a candidate for a Ph.D. degree in McGill's Division of Industrial and Cellulose Chemistry. For the past four summers he has worked on organic syntheses at the Central Research Laboratory of Canadian Industries Ltd., McMasterville.

KVP Names Black Vice President; Board Vacancy Filled

ROBERT T. BLACK, former manager of Kalamazoo Vegetable Parchment Co.'s branch plant in Devon, Pa., has been named vice president and general manager of the firm's subsidiary, Harvey Paper Products Co., Sturgis, Mich. He assumed his duties there January 1, succeeding Paul F. Picker, retired.

Mr. Black has been with the firm for 27 years, being in the Printing Division prior to the time he went to Devon in 1944. Harvey Paper Products is a large producer of formed paper specialties, place mats, table accessories, cups, pan liners, etc.

WILLIAM A. PATON, holder of the Edwin F. Gay professorship of accounting at the University of Michigan, has been appointed to fill a vacancy on the KVP board of directors. A graduate of Michigan, Dr. Paton received his doctorate from that school in 1917. With the exception of appointments at the universities of Chicago, California, and Minnesota and service with the War Trade Board in 1918, he has been continuously identified with the Michigan faculty since 1915. In 1940 he was Dickinson lecturer at the Harvard Graduate School of Business Administration. He is a past president of the American Accounting Association and has long been active in the American Institute of Accountants.

Sheehy Elected to Rayonier Board

Election of *JAMES T. SHEEHY* to the board of directors of Rayonier, Inc., has been announced by Clyde B. Morgan, president. In addition to his new responsibilities, Mr. Sheehy, as executive vice president, directs the firm's production, research, finance, timber, and other operations.

Mr. Sheehy joined Rayonier in 1933 as a pulp tester at the company's Grays Harbor, Wash., mill shortly after graduation from the University of Washington. In time he was made mill control chemist, assistant chief chemist, chief chemist, and assistant plant manager. In 1945 he was appointed plant manager at the Fernandina, Fla., division.

J. T. Doerfler

A. D. Wilkinson

R. T. Black

W. A. Paton

J. T. Sheehy

C. D. Dickey Jr.

Doerfler Retires After 48 Years with K-C

JOSEPH T. DOERFLER will retire in April as manager of the Kimberly, Wis., mill of Kimberly-Clark Corp. He has been associated with the firm nearly 48 years, almost a quarter century of that time as Kimberly manager. He will be succeeded in the post by *A. D. WILKINSON*, production manager at Kimberly.

Mr. Doerfler began his career with Kimberly-Clark in 1905 as a marker in the finishing room. From 1923 until he was named mill manager in 1928, he served in the staff power department in Neenah and spent considerable time in construction at Spruce Falls Power & Paper Co. Ltd. (a K-C affiliate) at Kapuskasing, Ont. He also worked on construction at the Niagara Falls, N.Y., plant.

A graduate in chemistry from Cornell College in Iowa, Mr. Wilkinson became assistant to the Kimberly paper mill superintendent in 1934. He was named superintendent in 1942. After four years in Neenah as staff superintendent in paper operations and assistant chief mill manager, he returned to Kimberly in 1949 as production manager.

Rayonier Appoints Two at Jessup Division

The appointment of *CHARLES E. ROTH* as mill superintendent of the Jessup (Ga.) Division of Rayonier Inc. has been announced by Thomas R. Stein, resident manager. *RALPH V. ZEPP* has been named assistant resident engineer.

Until his appointment, Mr. Roth held a position as pulp mill superintendent with Riegel Carolina Corp. at Acme, N.C. A graduate of Ohio State University in chemical engineering in 1932, he received his master's degree at the Institute of Paper Chemistry in 1934.

Mr. Zepp was formerly employed by Minnesota & Ontario Paper Co. at International Falls, Minn., as project engineer in charge of construction work and other maintenance projects. He is a civil engineering graduate of the University of Minnesota.

CHARLES D. DICKEY JR. has been named manager of procurement for Scott Paper Co.'s West Coast operations. He will make his headquarters at the firm's Soundview Division pulp mill at Everett, Wash. A graduate of Yale University, he started with Scott in 1946 as an industrial salesman.

C-Z Promotes Two At Camas Mill

Crown Zellerbach Corp. has announced two promotions at its Camas, Wash., mill. *FRANK A. DRUMB*, resident manager since 1947, has been named an assistant vice president and will have charge of special projects over the firm's many operations. He will make his headquarters in San Francisco. Succeeding Mr. Drumb is *GEORGE H. GALLAWAY*, formerly assistant resident manager.

Mr. Drumb joined C-Z in 1927 as assistant resident manager at Camas. Prior to that he had been associated with Consolidated Water Power & Paper Co. at Wisconsin Rapids, Wis. In 1933 he became resident manager of the Ocean Falls, B.C., mill of Pacific Mills Ltd. In 1941 Mr. Drumb was made assistant to the late Albert Bankus, C-Z vice president. During

World War II he served as director of industrial and public relations while Col. Alexander R. Heron was in military service. In 1946 he became assistant manager of manufacturing, with offices in San Francisco. He went to Camas as resident manager in 1947.

Mr. Gallaway joined C-Z in 1933 as a pulp tester at Camas, shortly after his graduation from Oregon State College with a degree in chemical engineering. He became technical supervisor in 1944 and technical assistant to the paper mill superintendent in 1946. In 1947 he was promoted to resident manager at Lebanon, Ore., transferred in the same capacity to Carthage, N.Y., in 1950. He returned to Camas as assistant resident manager in 1952.

LAWTON FORD has been appointed personnel manager of the Jesup Division of Rayonier Inc. He retired a year ago as a rear admiral in the U.S. Coast Guard, after 24 years service.

tions Board Packaging Advisory Committee.

On February 1 George E. Dyke, president of Gair, announced the appointment of *ALAN GRAYSON LYNN* as manager of products development for shipping containers and related products. He joined that department in 1949. A graduate of Washington and Lee University, he has been in the container industry 24 years.

Top Level Changes at Mando

J. B. Faegre, president of Minnesota & Ontario Paper Co., has announced two top level management changes. *C. T. McMURRAY*, a director and former executive vice president, has been made senior vice president, and *ROBERT FAEGRE*, formerly vice president for paper sales, was named executive vice president.

Mr. McMurray, a veteran of 35 years' service with Mando, 30 of them as an executive of the firm, will now be a consultant and advisor to top management. At one time he was resident manager of both the International Falls and Fort Frances mills. From 1941 to 1950 he held the position of vice president for sales.

Mr. Faegre will now be directly responsible to the president for all production, sales, research, industrial relations, traffic, advertising, and purchasing functions. He joined Mando in 1938 as special representative of Insulite Co. of Finland, then a subsidiary. He also served as assistant sales manager of the Insulite Division.

RON GOURLAY has been named assistant to Paul E. Cooper, president of Pacific Mills Ltd. of Vancouver, B.C. *R. H. R. YOUNG*, also of Pacific Mills, has been made assistant vice president for manufacture of Crown Zellerbach Corp., San Francisco.

Stone Container Appoints Three

HOMER A. HAMM has been appointed director of research and product development for Stone Container Corp.'s corrugated container plants and paper mills. Mr. Hamm received a doctor's degree in chemistry at Johns Hopkins University in 1936. Before joining Stone he was associated in research capacities with Talon Inc. and Eversharp Inc. Together with George Holmes, he is credited with designing Stone's new research laboratory.

In other appointments, *GEORGE BERLIANT*, who joined the container firm in 1936, has been elevated from a supervisory capacity in the standards department to works manager of the Chicago division; while *FRED WAUGH*, who has 30 years' experience in the industry, has been named works manager of the Mansfield, Ohio, division.

J. D. Malcolmson

A. G. Lynn

C. T. McMurray

Robert Faegre

Geo. Berliant

Fred Waugh

Malcolmson Relinquishes Gair Products Development Duties

J. D. MALCOLMSON, nationally known packaging expert, has relinquished his duties as manager of the Products Development Department of Robert Gair Co. Inc., New York, N.Y. Mr. Malcolmson has moved his residence to Berkeley, Cal., but will remain on Gair's staff and continue to represent the firm on various committees that he now serves.

With the industry since 1916, Mr. Malcolmson has been associated with Gair since 1922. A Fellow of the Mellon Institute of Industrial Research in Pittsburg from 1916 to 1922, he was at one time doing research for the National Container Association, where the first technical study of the corrugated box was made.

Mr. Malcolmson is a member of the executive committee of Tappi, is on the board of directors of the Packaging Institute, and serves as chairman of the technical advisory committee of the Fibre Box Association. He was for two years packaging vice president of the American Management Association and is currently the only representative of the paperboard industry on the Muni-

Two additions to the supervisory staff of Escanaba Paper Co., Escanaba, Mich., were recently announced. *MARTIN L. HOOK* was appointed assistant division engineer, replacing *DON G. ESTEBO*, who was transferred to the Mead mill at Leominster, Mass.; and *GEORGE C. EASTIN, JR.* was appointed technical director, a newly created position.

R. A. ROBERTSON, president and managing director of George Weston Ltd., has been appointed president of E. B. Eddy Co., Hull, Que., and Eddy Paper Co., also of Hull.

R. W. MAHONEY, executive vice president and general manager of Appleton Coated Paper Co., Appleton, Wis., has been elected president of the firm to succeed the late Charles S. Boyd.

NORVAL BARLAMENT, former chief engineer at Hudson-Sharp Machine Co., has joined the engineering staff of Hoberg Paper Mills Inc., Green Bay, Wis. He will be in charge of engineering problems and the future development of the converting department.

PERCY J. EBBOTT, president of the Chase National Bank, has been elected a director of International Paper Co. His appointment fills the vacancy caused by the resignation, effective January 19, of Winthrop W. Aldrich, former chairman of the Chase National and now U. S. ambassador-designate to Great Britain.

The Paper Industry Safety News

Four Year Record: 11 Ontario Mills Reduce Accidents 60 Per Cent

THE ELEVEN MEMBER mills of the Northwestern Branch of the Ontario Pulp & Paper Makers' Safety Association have reduced their collective frequency rate almost 60 per cent since the group's first meeting, October 6, 1948. In his year-end report, General Chairman Fred O. Soughton pointed out that the rate has dropped from 31.2 disabling injuries per 1,000,000 man-hours worked in 1948 to 12.6 for the first 10 months of 1952. Mr. Soughton, services and safety supervisor for LongLac Pulp & Paper Co. Ltd. at Terrace Bay, spoke at a meeting of the branch in Port Arthur.

Reviewing the accomplishments of his organization, Mr. Soughton emphasized the role played by management in the success of any safety program. ". . . we should be mindful of the fact that the basic responsibility for accident prevention must rest with management," he declared. "Nevertheless, as I have said before and shall continue to emphasize, the fundamental principle should be ever before us, that safety is a personal responsibility. This fact must be taught by those whose responsibility it is to teach and learned by those whose job it is to learn. And if we are to be successful, no one can be given an exemption from the task on any grounds. . . ."

Mr. Soughton stressed the fact that the results achieved through the safety program of the Northwestern Branch warrant the expenditure of time, effort and financing involved. To substantiate his conclusion, he called attention to the following facts.

1. In 1948 the member mills suffered 447 lost-time injuries. Had this rate continued during the past four years the mills would have experienced 1,788 lost-time injuries. As it is (first 10 months of 1952 included), the actual four-year total is less than 900.

2. While it is impractical to attempt to estimate the actual number of workdays lost through 1952, Mr. Soughton expressed the opinion that they will be substantially below any previous year. However, the speaker continued, "you may recall that at our meeting last February I reported that 5,445 workdays, or almost 44,000 man-hours, had been conserved by the gains recorded by our 11 member mills. . . ."

Lost-time rate improving

3. The branch's lost-time injury rate has steadily decreased, and 1952's frequency rate (through October) of 12.6 is an improvement of nearly 10 per cent over 1951. This gain is more significant, Mr. Soughton continued, when it is considered that the rate for all Ontario pulp and paper mills during the first 10 months of 1952 was 16.7, a decline of 7 per cent from 1951.

4. The collective frequency rate of the Northwestern Branch now betters the all-Ontario rate by almost 25 per cent.

"All the credit for the success which has been achieved cannot be assumed by our organization," Mr. Soughton declared, "but I would like to feel and am certain that our efforts have had a measurable bearing on the results. And speaking of the efforts of this branch, it is important that I should refer to the excellent cooperation which has existed . . . between labor and management representatives. . . . It is my fervent hope that the type of cooperation which has been so much in evidence during the past year in the affairs of this organization will permeate the accident prevention program in all of our mills."

Gimmicks

Referring particularly to the safety program at the Terrace Bay mill of LongLac, Mr. Soughton declared that "gimmicks" plus an extensive program of signs and contests, in addition to standard types of committees, inspections and investigations, are literally making hundreds of thousands of impressions on LongLac employees. In conclusion, he pointed out that, despite the fact that the Terrace Bay mill had the lowest frequency rate of any mill in the branch in 1951, the 1952 improvement of 65 per cent represents the best improvement of any of the member mills that work more than 1,000,000 man-hours per year.

1952 NSC Pulp and Paper Contest Shows 5 Per Cent Rate Reduction

COMPETING MILLS in the 1952 National Safety Council contest for pulp and paper firms have reported an accident frequency rate 5 per cent below that of 1951. Forty-three contestants maintained perfect scores, as compared to only 31 for the previous year. The year's frequency rate for all division was 9.32; for the pulp and paper division 9.03, and for paper converting 10.13. Contestants numbered 437.

The total exposure reported was 482,718,000 man-hours, up 1 per cent from the 475,736,000 of 1951. A total of 4,497 injuries was reported, down 4 per cent from the year before.

The frequency rates for the two major divisions were as follows: pulp and paper, 9.03, down 6 per cent; paper converting, 10.13, down 4 per cent. Mills in Division I averaging 170,001 or more man-hours monthly reported a 4 per cent increase; those averaging 85,001 to 170,000, a 6 per cent decrease; those averaging 42,501 to 85,000, a 29 per cent decrease, and those averaging 6,000 to 42,500, an 8 per cent decrease.

In paper converting, the Paper Bag Group showed a decrease of 18 per cent; Boxes and Cartons, an increase of 2 per cent; Roofing Paper, an increase of 43 per cent; Insulation and Building Board, a decrease of 10 per cent, and Pulp and Paper Specialties, a decrease of 1 per cent.

From eligible mills in Division I the board of judges will choose the mill with the most outstanding record. That mill will be awarded the grand prize, the Edward Benton Fritz Memorial Trophy, presented by THE PAPER INDUSTRY. The award will be made during the National Safety Congress in October.

Mills listed by the NSC in its final 1952 tabulation, with frequency rates in parentheses, are as follows:

Division I—Pulp and Paper Mills

Group A

1—Ecusta Paper Corp., Pisgah Forest, N.C., (0.42)
2—Champion Paper & Fibre Co., Hamilton, Ohio, (0.74)
3—Gulf States Paper Corp., Tuscaloosa, Ala., (0.91)

Group B

1—Fraser Paper Ltd., Madawaska, Maine, (0.60)
2—West Virginia Pulp & Paper Co., Tyrone, Pa., (0.64)

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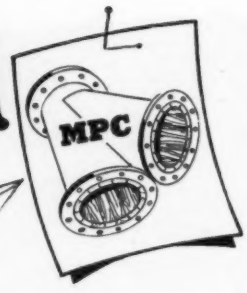

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3—Gaspesia Sulphite Co. Ltd., Chandler, Que., (0.87)

Group C

1—International Paper Co., Southern Kraft Div., Mobile, Ala., (0.00)
1—Abitibi Power & Paper Co. Ltd., Fort William, Ont., (0.00)
3—West Virginia Pulp & Paper Co., Williamsburg, Pa., (1.11)

Group D

1—Certain-Teed Products Corp., York, Pa., (0.00)
1—Masonite Co. of Canada Ltd., Gatineau, Que., (0.00)
1—Central Fibre Products Co., Tama, Iowa, (0.00)
1—Marathon Corp., Ashland, Wis., (0.00)
1—Strathmore Paper Co., Mill No. 1, Woronoco, Mass., (0.00)
1—Johns-Manville Corp., Asbestos, Que., (0.00)
1—U. S. Gypsum Co., North Kansas City, Mo., (0.00)
1—U.S. Gypsum Co., Oakmont, Pa., (0.00)
1—Lloyd A. Fry Roofing Co., North Kansas City, Mo., (0.00)
1—Lloyd A. Fry Roofing Co., Memphis, Tenn., (0.00)
1—National Gypsum Co., Pryor, Okla., (0.00)
1—Lloyd A. Fry Roofing Co., Jacksonville, Fla., (0.00)
1—Riegel Paper Corp., Riegelsville, N.J., (0.00)
1—Container Corp. of America, Wilmington, Del., (0.00)
1—Johns-Manville Corp., Tilton, N.H., (0.00)
1—Volney Felt Mills Inc., Fulton, N.Y., (0.00)
1—American Writing Paper Corp., Mount Tom Div., Holyoke, Mass., (0.00)
1—Amalgamated Roofing Co., Chicago, (0.00)
1—International Paper Co., Riley, Maine, (0.00)
1—Volney Felt Mills Inc., Mishawaka, Ind., (0.00)
1—Spaulding Fibre Co., North Rochester, N.H., (0.00)

Division II—Paper Converting

Paper Bags

1—Pillsbury Mills Inc., Wellsburg, W. Va., (0.00)
1—St. Regis Paper Co. Ltd., Vancouver, B.C., (0.00)
1—St. Regis Paper Co., Playa Ponce, Puerto Rico, (0.00)

Boxes and Cartons

Group A

1—Container Corp. of America, Folding Div., Philadelphia, (0.00)
2—General Foods Corp., Carton and Con-Div., Philadelphia, (0.84)
3—Container Corp. of America, F & C Div., Philadelphia, (0.84)

Group B

1—Gaylord Container Corp., Dallas, Texas, (0.00)
1—Container Corp. of America, Greensboro, N.C., (0.00)
1—Gaylord Container Corp., Carton Plant, (0.00)
1—Green Bay Box Co., Corrugated Div., Green Bay, Wis., (0.00)
1—Southwest Corrugated Box Co., Sand Springs, Okla., (0.00)
1—Hankins Container Co., Chicago, (0.00)
1—Container Corp. of America, Philadelphia (Sixth St.), Pa., (0.00)
1—Hankins Container Co., Elmira, N.Y., (0.00)

Roofing Paper

1—Flintkote Co., Chicago Heights, Ill., (0.00)
1—Lloyd A. Fry Roofing Co., Stroud, Okla., (0.00)
1—Lloyd A. Fry Roofing Co., York, Pa., (0.00)
1—Lloyd A. Fry Roofing Co., South Kearny, N.J., (0.00)
1—Lloyd A. Fry Roofing Co., Waltham, Mass., (0.00)

Insulation and Building Board

1—Abitibi Power & Paper Co. Ltd., Sturgeon Falls, Ont., (0.00)
2—Wood Conversion Co., Cloquet, Minn., (1.48)
3—National Gypsum Co., Mobile, Ala., (1.86)

Specialties

1—Lily-Tulip Cup Corp., Augusta, Ga., (0.00)
1—Lily-Tulip Cup Corp., Brooklyn, N.Y., (0.00)
3—Canadian Cellucotton Products Ltd., Niagara Falls, Ont., (1.11)

International Division Reports Safety Improvement for 1952

A CONSIDERABLE reduction in the number of lost-time injuries—with only a slight decrease in the number of man-hours worked—has resulted in an outstanding 1952 "frequency" experience in the six mills of the Northern Division of International Paper Co. (The mills included are those at York Haven, Pa.; Palmer, North Tonawanda, Niagara Falls and Ticonderoga, N.Y., and at Chisholm, Maine.)

During 1952 there were 68 injuries reported, as compared to the 87 during 1951. The frequency rate was 6.63, as against 8.03 for the previous year. For the first nine months of 1952 the U.S. Bureau of Labor Statistics reported a frequency of 14.8 for the paper industry as a whole; while for the first 10 months the National Safety Council reported a rate of 9.37 for its members among pulp and paper manufacturers.

Of the 68 injuries reported, there was a decided decrease—from 26 to 19—of the more serious types, those resulting in permanent partial injuries for which specific penalty charges are made according to the nature of the injury. This was a factor in the reduction of the "severity" rate (days lost per 1,000 man-hours worked) from 1.63 in 1951 to 0.98 last year. There was one fatality.

This took place at the Ticonderoga mill, and the usual 6,000 penalty days were charged.

York Haven outstanding

While all six mills contributed to the over-all experience, the York Haven operation was outstanding in that there were no lost-time injuries during the year. York Haven has long held leadership in this respect, not only among International mills, but also in the industry.

Noted in the official report issued by International was the fact that injuries resulting from falls, falling objects and mis-handling of materials continue to be the causes of the majority of injuries, accounting for 60 per cent of the total reported.

1952 was the fifth consecutive year in which the Northern Division has had a combined frequency rate of less than 10. The 6.63 for last year was the lowest yet reported.

Injury analyses

Peronnel in repair work suffered the greatest number of accidents, with 19 reported. Other injuries according to occupation were as follows: Paper machines, 11; finishing and paper handling, 11; groundwood, 8; beaters, 4; wood handling, sulfite or soda, book stock, indoor miscellaneous and outdoor miscellaneous, 2; wood preparation, power plant (steam), bindarene, coating and technical control, 1.

Breaks and fractures led in types of injuries with 20. Other types were: Cuts, bruises and lacerations, 14; sprains and strains, 14; amputations, 6; hernia, 4; infections, 2; burns and scalds, and fatal, 1, and miscellaneous, 6.

The handling of objects was the principal cause of accidents with 21. Other causes were: Falls of persons, 11; falling objects, 11; paper working machinery, 7; manually operated machinery, 3; hot substances, 3; poisonous substances, 3; vehicles, 2; power transmission, 1; hoisting apparatus, 1, and miscellaneous, 5.

Mando Mill Receives Honor for Fire Protection

The National Fire Protection Association has awarded international industrial safety honors to Minnesota & Ontario Paper Co.'s Kenora, Ont., newsprint mill. The mill placed sixth in the NFPA's contest to determine United States and Canadian industrial concerns having the best fire protection and prevention programs.

Besides finishing sixth in the international contest, the Kenora mill placed second among Canadian entries. The Mando entry was compiled by Max Lachapelle, assistant chief of the mill's fire brigade.

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Foreign Abstracts . . . . . .

The new steam power plant. In the background is the old plant and behind it the spirit mill. Of the sulfite mill, left, only the acid tower and a part of the sulfur storage are visible

Steam power plant in the Kaukas mills

In Finland, on the southern shore of Lake Saimen, a series of mills of the Aktiebolaget Kaukas Fabrik produces chemical wood pulp, sulfite alcohol, board, sawn timber, etc. A new steam power station, which went into full operation in 1952, furnishes these mills with process steam and electric power. The accompanying photograph shows this installation.

The plant is not large. Its capacity is 200,000 lb. steam per hour, but it is thoroughly modern and is the first plant in Finland using a steam pressure of 910 lb. psi. in the boiler headers, and steam temperature of 930° F. after superheating. All types of fuel can be used in the new plant: coal, oil, wood-refuse and even ordinary firewood (whereas only wood could be used in the old installation which is now only a stand-by power plant).

The boiler installations (La Mont type) and their functioning are described briefly. The two boilers (each of which has two furnaces) are furnished with superheaters, economizers, preheaters and fly-ash collectors. Two such collectors are installed per boiler and each functions differently. The first separates coarser particles of wood refuse (incompletely burned). The second, which consists of a great number of small cyclones, processes the finer fly-ash from pulverized coal and flushes the separated ash continuously into a sedimentation basin located on the lake shore. Thus, air pollution is (in the main) avoided. A water purification plant, uses "chlorinated" ferrous sulfate as coagulant before the softening in Zeolite exchangers takes place.

The main power aggregate of the new plant is a de Laval extracting backpressure turbine coupled with a (Swedish) 14,000 kva generator. The by-product power obtainable from process steam is now 8,000 kw and may be raised to 11,000 kw. The additional backpressure energy compensates for the higher capital investment. Future plans are discussed. Anon. *Finnish Paper and Timber*, **3**, No. 9, 112-113 (1952). (In English.)

Chemical pulps evaluated by screen analysis

Whereas in modern groundwood mills screen analysis has been used as a control method, the procedure has not been applied to chemical pulps. Here the laborious fiber-length determinations have been preferred.

Existing classifiers seem to show deficiencies in evaluating chemical pulps, and a suitable apparatus should meet the following requirements. The fibers must be kept well-suspended and in horizontal motion (*i.e.*, never occupying a position perpendicular to the screening surface, especially when in close proximity to the screen). Water must be so regulated that its flow prevents fiber sedimentation and plugging of the screen. Fibers must not adhere to stirrers (or any moving elements) of the classifier. External influences which might cause impairment to the constant and uniform flow of water must be avoided, including the dead space which may exist at the center of a rotating, circular screening surface.

Details are given for a new classifier which, the author claims, seeks to meet these requirements. This includes a circular tank and screening surface. There are no mechanical stirrers. A cylindrical central piece occupies the "dead space" of the screening area. The water which is admitted is sprayed tangentially against the walls of this central cylinder. The following optima are determined: (a) water admitted per unit time; (b) washing period; (c) dilution of pulp; (d) screen numbers; and (e) head.

The operation of the new instrument is described. The method is reproducible and is found suitable for differentiating fractions of beaten chemical pulps (even when these pulps are very slow). Individual fractions obtained by screen analysis are checked by means of the microscope. The "subjective" errors found in the usual microscopic determinations are outlined; these include the disregarding of certain, variable amounts of the finest pulp fractions.

In further evaluation of the screen-analytical data, a method for determining the mean fiber length (I) is described. I for a given pulp sample is gauged from the frequency of the percentages of the different fractions and by the use of a diagram which permits the direct reading of I (obtained by the correlation of the long fibers and the finest fraction of a pulp). Examples are given. Helmut Schroeter. *Wochbl. Papierfabr.*, **80**, 388, 390, 392, 394; 559-63; 595-9; 631-3 (1952). (In German.) Through *Bull. Inst. Paper Chem.*, **23**, 273-274 (1952).

Pulpwood in Saskatchewan

Recent forest inventory figures from the Department of Natural resources indicate that this Canadian province has at least 16 million cords of white and black sprucewood and 24 million cords of coniferous woods in general that can be used for pulping. This inventory was taken in areas within economic distances from railroad shipping points.

The province also has adequate potential water power, bunker fuels, cheap coal, and (possibly) natural gas. Any type of pulp mill suitably located in the province of Saskatchewan should, therefore, be assured of ample supplies. J. H. Brokelbank. *Pulp Paper Mag. Can.*, **53**, No. 11, 94 (1952). Through *Bull. Inst. Paper Chem.*, **23**, 267 (1952).

Degradation of cotton and wood pulp with acids and sulfite waste liquor

The technical importance of cellulose degradation by means of various acids is discussed. The author has made a more extensive study than those of the past, using a carefully prepared high molecular weight lignosulfonic acid (I), sulfuric acid (II),

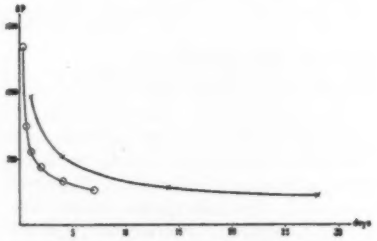
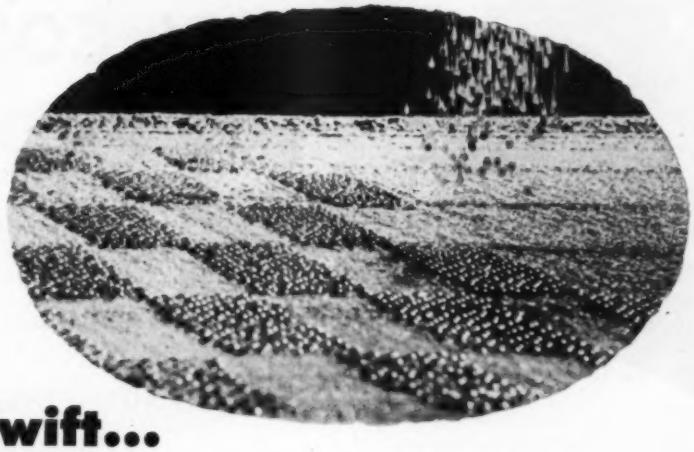


Fig. 1—DP versus time. Hydrolysis of cotton at 90°C.
× high polymer lignosulfonic acid
○ sulfuric acid

and a spent sulfite liquor (III). The concentrations of I and II were equivalent in terms of their ability to catalyze the hydrolysis of sucrose at 90°C. The celluloses used were: a carefully purified cotton (vis-

Shown here is one phase of Swift's exclusive process. The protein liquor falls on a bed of dry finished product.



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cosity 300 centipoises) and a bleached spruce sulfite pulp (viscosity, 27 centipoises). I showed a concentration of 0.0065 equivalents per liter; II was 0.01*N*.

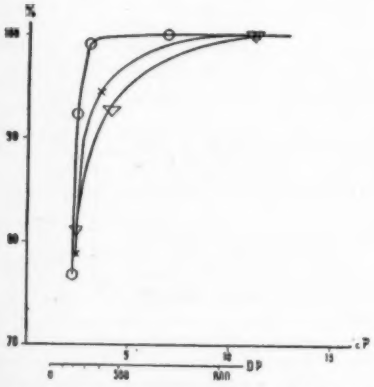

Fig. 2—The yield versus viscosity. Hydrolysis of cotton at 100°C.
× high polymer lignosulfonic acid purified by means of Amberlite IR-4B
▽ high polymer lignosulfonic acid purified by means of Amberlite IRA-400
○ sulfuric acid

The following studies were made: drop in viscosity with time, drop in degree of polymerization (D.P.) with time; yield versus viscosity; hot and cold alkali-solubility versus viscosity; and "carboxyl numbers" versus viscosity. At 90°C. marked differences were noted between the action of I and II on cotton; I being less drastic than II, when the D.P. was plotted against time. In the case of I, the large dimensions of the lignosulfonic acid molecules prevented their entrance into certain parts of the cellulose fiber. [Methods for purifying I to remove lower molecular weight sulfonic acids are fully described, and the equipment is illustrated].

No marked differences were found when the spent liquor (III) and II were compared in *their* action on cotton (at 170°C). Here the effects were very similar, indicating that the lower, more penetrating sulfonic acids come into play. When the action of I (versus II) was measured at 100°C. and recorded in terms of the yield of residual cotton versus D.P., it was shown that, over a wide range, the yields from I were actually much lower than those obtained with II. These differences between the action of I and II are shown clearly in Figs. 1 and 2.

The hydrolysis of *wood pulp* by both II and III shows marked differences from those obtained in the case of *cotton*. Over a wide range, the rate of degradation of cotton with III is considerably greater than is that of wood pulp. As shown in Fig. 3 (which depicts viscosity versus time at 140°C.) the curves cross each other. However, in another graph not shown in this abstract, after a long time period at 170°C., with 0.01*N* sulfuric acid, the curves *again cross*. In other words, when this point is reached (at a D.P. of about 150-160 after 18-20 hours), the wood pulp is being hydrolyzed far more drastically than is the cotton. The latter shows practically no loss in viscosity (or D.P.) between 10 hours and 40 hours treatment, whereas the wood pulp shows a steady drop.

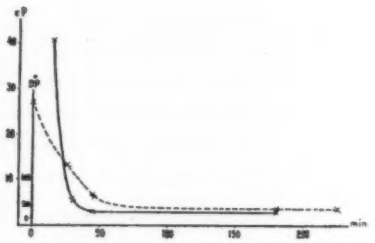

Fig. 3—The viscosity versus time. Hydrolysis performed at 140°C with sulfite waste liquor of cotton
—— cotton
..... wood pulp

Differences in the action of I, II and III are discussed fully. Data indicate that *eventually* the crystallites are more readily attacked in wood pulp than in cotton. Hydrolysis causes a marked decrease in carboxyl content, which occurs before the viscosity drops are too marked, and when losses in yield are still relatively small. This is especially true for wood pulp. Here II seems to have a somewhat greater effect (on lowering the carboxyl content) than has III. Fifteen graphs and 41 references are given. Nils Hartler and Olof Samuelson, *Svensk Papperstidn.*, **55**, 851-862 (1952). (In English.)

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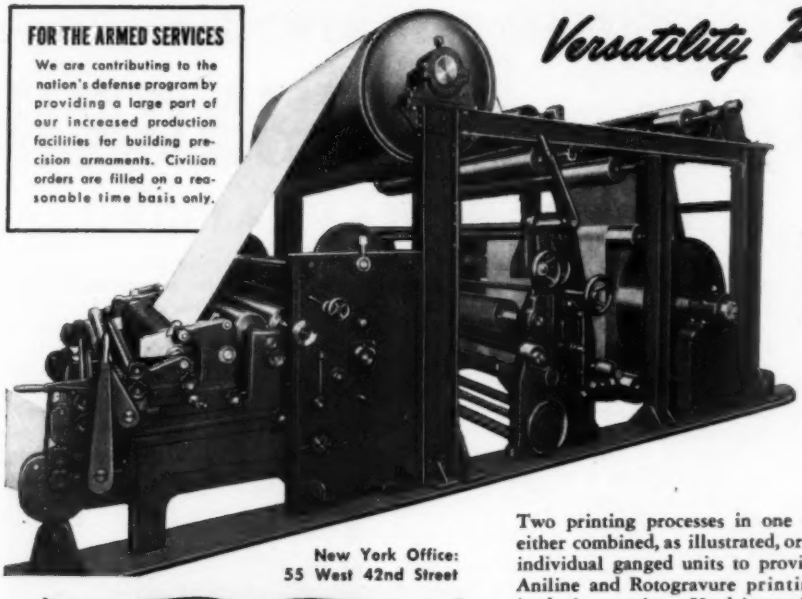

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4—Roto tinting or design printing and overprinting with aniline.

Two printing processes in one — either combined, as illustrated, or in individual ganged units to provide Aniline and Rotogravure printing in dual operations. Used in combination, these two print processes give you an exceptional wide range of decorating possibilities. Instant drying between processes is accomplished with 48" diameter steam drying rolls — one for each of two operations. Machine is built to any size web from 50" to 90" and processes sheet up to unit capacity. Double drum rewinders with slitters may be furnished, if desired. Machine is driven by horizontal shaft equipped with bevel gears and clutch throw-outs for each unit. Simplified construction permits addition of more colors in either Aniline or Roto. Write for complete details — Model No. 3-RA.

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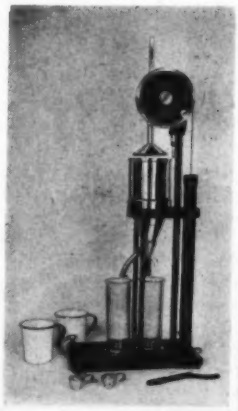

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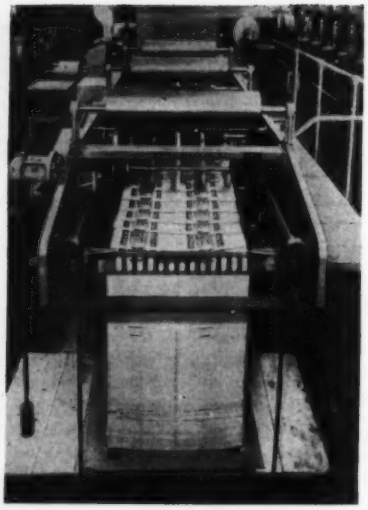
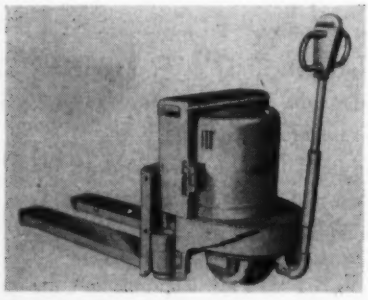
The Paper Industry New Products



Sheeter

A new high-speed sheeter that cuts from 8,500 to 11,000 sheets per hour of glassine and paper-backed foil; 10,500 to 12,500 sheets per hour of label paper; and 12,500 to 14,800 sheets per hour of heavy paper and cardboard is now available. According to the manufacturer, this new sheeter cuts consistently squared sheets to 1/64 in. accuracy from roll stock 1½ times faster than any other standard sheeter.

Operating on an entirely new principle of sheet delivery, this sheeter is designed around the basic fact that modern gravure inks dry very quickly. Therefore, sheets cut from roll stock can be overlapped and delivered to the pile in an unending stream. *Champlain Co., Inc., 88 Llewellyn Ave., Bloomfield, N.J.*



Pallet trucks

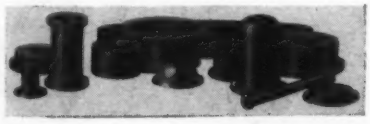
The first 1953 models in the Powrworker lift-truck line have been announced. The new models are pallet trucks, electric battery-powered, with a capacity rating up to 6,000 lb. These pallet trucks can be supplied with pallet forks to handle any size pallet, either single or double faced.

Some of the features of these trucks are double hoisting cylinders for lifting the loaded pallet; motor-in-wheel drive; full time delay control with all contactors interlocked for smooth, progressive speed positions; positive safety-spring return handle which applies brake and cuts off power, and a bumper guard located higher to avoid operator injury.

"Walk it" or "ride it" optional models are available. One is arranged for single tray (1 x 6) layout of battery, while the other accommodates a double tray (2 x 3) layout of battery. The Powrworker is the shortest pallet truck capable of carrying a double-tray battery. *Clark Equipment Co., Buchanan, Mich.*

Unloader

Fast and fully mechanical unloading of widely varied materials is handled by a new unloader. Completely controlled from the operator's seat, this unloader streamlines loading of freight cars, transport trucks and the placing of materials in storage. Compactly designed to provide unhampered operation of the lift truck, the unloader can be furnished for most Towmotor models. *Towmotor Corp., 1226 East 152nd St., Cleveland 10, Ohio.*



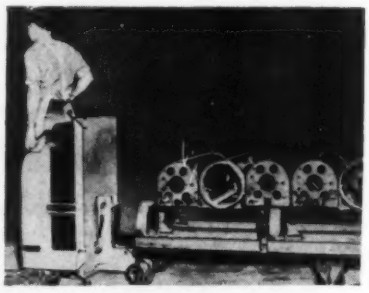
Piston seal

HydroSeal, a one-piece elastic piston seal, designed as an alternate for diaphragm or piston operated devices, has recently been announced.

A leakproof, movable seal for all pressures and strokes, HydroSeal can be incorporated in the design of pneumatic and hydraulic motor, glands, shaft seals, valve seals, cylinders, pumps, brake mechanisms and many other devices. It is presently being manufactured in natural rubber, Buna-N, Butyl and other synthetics designed to meet special applications.

Similar to conventional diaphragm construction, this seal also embraces a circumferential holding method, which utilizes a peripheral bead for pressure tightness. However, since it is substantially a cylindrical form of rubber, it will stretch, rather than flex as in the diaphragm, within the safe limits of the materials being used. In this stretching or elastic motion the stroke required is readily designed into the seal. Since it is always supported by metallic backing, i.e., the piston or ram, there is no tendency for the seal to rupture under high pressure.

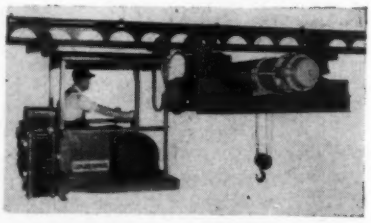
The HydroSeal can be designed to include a return spring rate. By variations of the wall thickness or varied compounding of the rubber-like material, the seal can be designed with given rate for return strokes, eliminating springs, counter-weights and other devices designed to return the piston or diaphragm to a beginning position. *Farris HydroSeal Corp., 521 Commercial Ave., Palisades Park, N. J.*



Rider-type tractor

A new rider-type tractor for handling semi-live skid loads is capable of handling loads up to 2,000 lb. and will travel up to 5 mph loaded and 4½ mph empty.

The tractor is very compact and light in weight. As a result, it has low battery capacity requirements and may be used on elevators and low-capacity floors like lofts. Its short length and offset drive wheel with 200° turning arc permit it to be used in crowded production areas or narrow warehouse aisles. In addition, it has a knee-action swivel caster which compensates for uneven floors. The power unit is the same unit as used on the Raymond straddle type, platform lift and low lift pallet trucks. *Raymond Corp., 8092 Madison St., Greene, N.Y.*



Overhead traveling carrier

A new overhead traveling carrier equipped with a hydraulic cell scale permits weighing of all loads handled quickly and easily. The hydraulic cell is operated by a lever to which is fastened the upper hoist block. Resulting pressure is transmitted from the cell to the scale dial by hydraulic tubing. The scale weighs in pounds or kilograms, as desired.

Both travel and hoisting motors are provided with variable speed controllers; in

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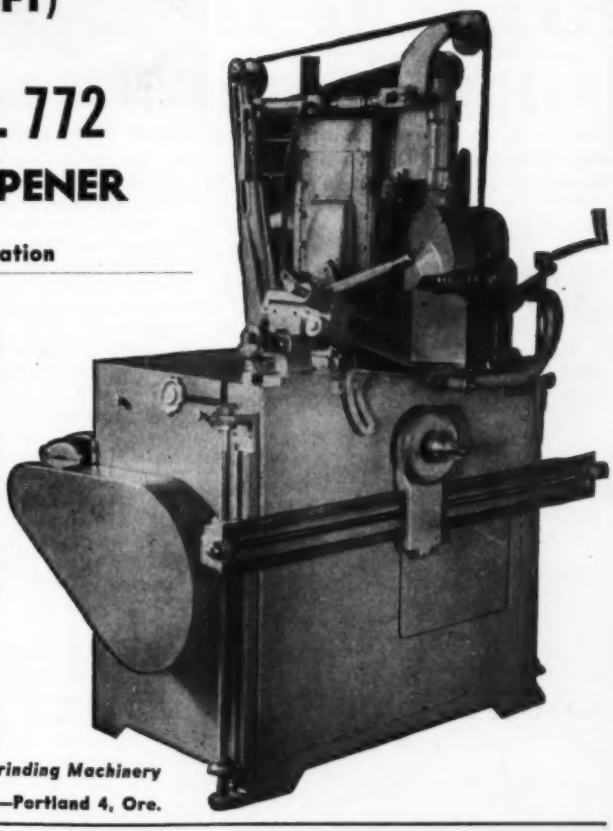

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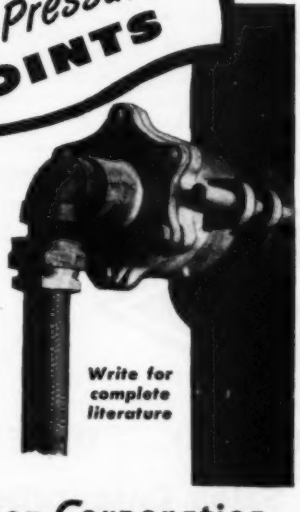

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2. More mills, and more machinery men, have adopted them than anything of their kind.

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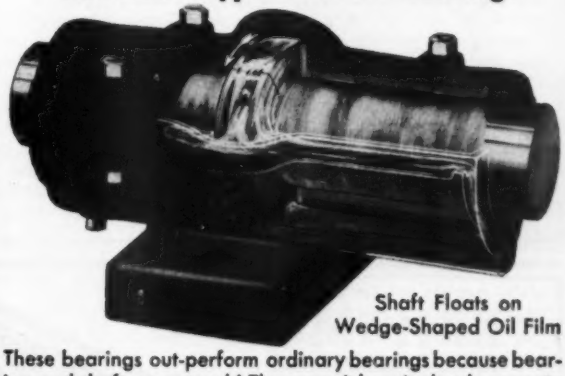

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These bearings out-perform ordinary bearings because bearing and shaft never touch! They permit heavier loads, operate at higher speeds and give uninterrupted flow of power. Oil flow is always ample, maintenance is minimized.

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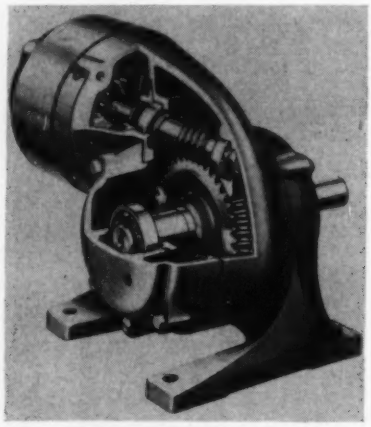
addition, the hoisting controller is designed for dynamic lowering. A safety switch is provided in the cab, and the travel motor is equipped with a foot-controlled electric brake. Also incorporated into the carrier is a weight-type limit switch which permits the operator to travel only when the load block is in high position. A screw-type limit switch is also provided for limiting the distance of travel when lowering. *Cleveland Tramrail Div., Cleveland Crane & Engineering Co., Wickliffe, Ohio.*



Worm-gear motor

An entirely new line of low speed right-angle worm-gear motors has recently been placed in production. Designated as Type GW Syncrogear, the design presents many features not heretofore available in low speed motors.

Type GW incorporates a cantilever design to protect gear alignment. Mounting stresses are absorbed by a rugged single unit pyramidal base with "spread eagle" feet. The gear and motor housing are free from distortion. It has self-locking brake action and embodies splash lubrication, a hardened and ground worm, leakproof oil seal and asbestos-protected windings.

This new motor is made in both 3-phase and single phase. It can be installed horizontally or upright and can be provided with a footless flange mounting. Other modifications provide variable speed, splash-proof design and total enclosure. *U. S. Electrical Motors Inc., P. O. Box 2058, Los Angeles 54, Calif.*

Tubular steel pallet

An all-purpose, heavy-duty tubular steel pallet, lighter than wood construction and priced competitively with wood pallets, is now being manufactured. It is an eight-entry pallet which features radical departures from conventional design.

Two or more stout tabular skid runners are welded and braced to a rectangular angle-iron frame which encases and protects a tough laminated wood deck. The sled-like construction permits easy movement over uneven surfaces and obstructions, making the pallet adaptable for handling materials in storage racks of any design, in conveyor systems and all phases of production and transportation.

This pallet is said to weigh several pounds less than a wood pallet of the same deck dimensions and load potential. The new pallets will be built to the customer's specifications without added cost. *Econoweld Co., 1805 Webster St., Dayton, Ohio.*

Round-chart recorder

Round-chart recorders and automatic controllers have been added to Bristol's line of electronic Dynamaster potentiometers and bridge instruments. The new round-chart Dynamaster models are accurate, high-speed, continuous-balance, null-type electronic instruments which can be used to measure any variable that can be translated into an electrical quantity such as dc current, dc voltage, capacitance, or resistance.

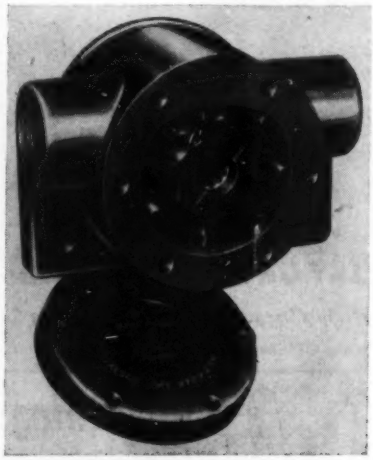
Typical sensing elements that can be used with the new instruments include thermocouples, radiation detecting units, resistance thermometer bulbs, pH amplifiers, tachometer magnetos, strain gauges, smoke density detectors, thermal converters for power measurements, beta ray gauges, and many others.

The measured variable is simultaneously recorded on a 12-in. diameter chart and indicated on a large circular scale which is legible at a distance. These round-chart instruments feature the same design, construction and electronic components as the company's strip-chart Dynamaster instruments. *Bristol Co., Waterbury 20, Conn.*

Industrial fungicide

A new preservative, Rosin Amine D Pentachlorophenate, recently made available for commercial use, has been subjected to an extensive four-year test program as a preservative for wood, textiles, cordage, felt, paper and other materials which are susceptible to rot and decay. This research program has been a cooperative project of Hercules Powder Co. and Monsanto Chemical Co.

This new product is a reaction product of pentachlorophenol and Rosin Amine D, a primary amine. A resinous solid, it is readily soluble in a wide range of oils and hydrocarbons and may be readily emulsified. It is used in concentrations of .3 to 1.5 per cent as a fungus preventive for cordage, textiles, paper, and felt. It is relatively non-irritating to the skin. *Hercules Powder Co., Wilmington, Del.*



Neoprene impeller pump

The Jabsco flexible neoprene impeller pump is now available in hard rubber construction for handling acids, alkalies, and other corrosives at moderate cost.

Though nominally only ¾ in. in size, the pump delivers 15 gpm at 22 ft. head, or 5 gpm at 72 ft. head. The maximum capacities are 95 ft. head or 16 gpm. It pumps viscous or thin liquids, and is resistant to alkalies, solutions of metallic salts, inorganic acids, hydrochloric acid any strength, and any other liquid that can be

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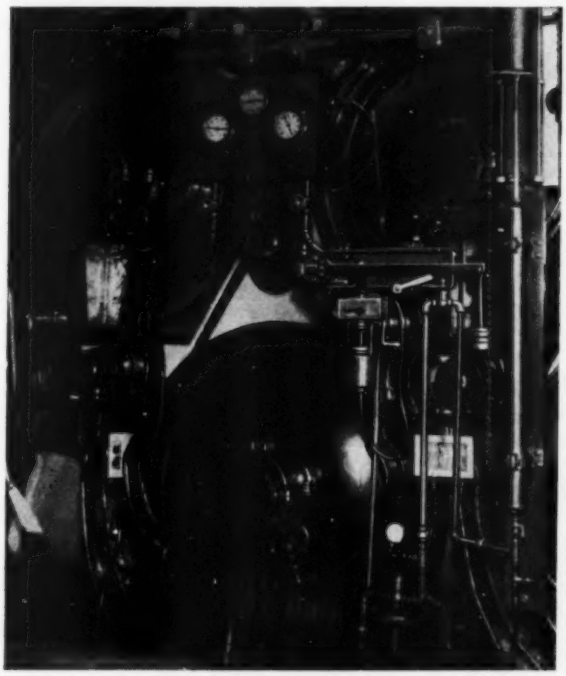
Mills report 4 advantages of Stickle Automatic Tension and Thermal Control



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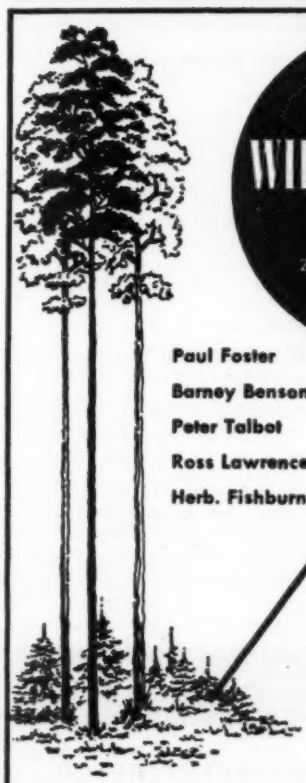

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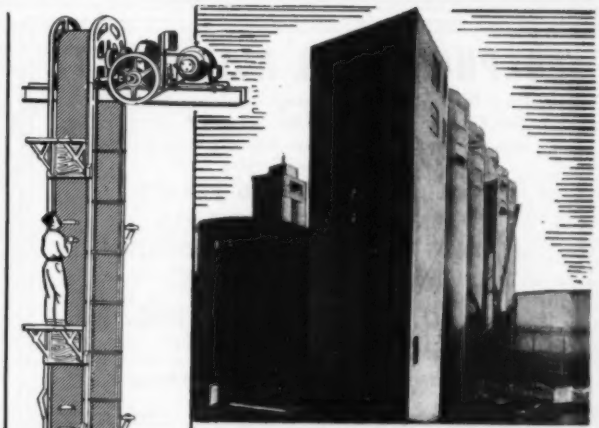

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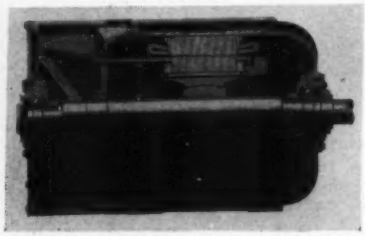
handled by neoprene, as the hard rubber casing generally is more resistant than the impeller.

The corrosion-resistant Ace hard rubber is used in the molded pump casing, cover plate, gland parts, and drip pan. The base is cast iron painted with acid-resistant paint. Mounting bolts and studs are stainless steel. The shaft, impeller insert and key are made of Hastelloy C. *American Hard Rubber Co., 93 Worth St., New York 13, N. Y.*



High-slip motor

A new totally enclosed, fan-cooled, high-slip induction motor, designed for use in acceleration of high-inertia loads such as punch presses, centrifuges, hoists, etc., is designated as Type KRX.

The manufacturers claim that the new motor is as much as 30 per cent smaller and 40 per cent lighter than other conventional motors of this type. This space and weight reduction is the result of the motor's new extended-bar design, which provides dissipation of the increased heat normally generated by high-slip motors. *General Electric Co., Schenectady 5, NY.*

Variable speed changer

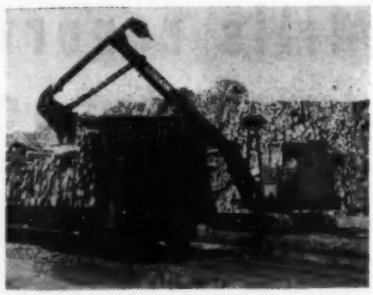
The new Type 3A variable speed changer weighs less than 6 oz. and is small enough to hide in your hand. All speeds over a wide range are selected smoothly and quickly, whether the unit is running or stopped. High output torques and low no load input torques are achieved by unique design.

Speed is controlled by an adjusting knob equipped with friction drag to prevent ratio wander. In addition, lever, push-rod, spur gear, miter gear and worm gear speed controls are available. A dial and pointer on the top of the unit indicates speed ratio. *Metron Instrument Co., 432 Lincoln St., Denver 9, Colo.*

Acetylene-air gas torch

A new pistol-shaped automatic acetylene-air gas torch, known as the "Torch-O-Matic," lights at a squeeze of the trigger and shuts off upon release, eliminating separate operation and equipment for re-lighting, manual valve adjustment, pumping or priming, and warm-up. The trigger can also be locked open for continuous flame.

The torch weighs 12 oz. and provides instantaneous heat up to 2800°. Combustion tubes available in three sizes permit use of the torch for any air-acetylene job from heavy soldering or heating to the finest precision work. Accessories include pressure regulator, with either MC or B tank coupling; tank and operating pressure gauges; hose and hose clamps; lighting flints; combustion tubes and nozzles, and extension tips. *Velocity Power Tool Co., 7505 Thomas Blvd., Pittsburgh 8, Pa.*



Pulpwood unloading attachment

A special front end attachment perfected for unloading pulpwood rack cars, called the Lorain Rake, is now available for use on ¾ yard Lorain TL-25 models on crawlers or rubber-tire carriers.

Equipped with a gooseneck boom, its maximum reach of 31 ft. can unload a car in from 10 to 12 minutes, or as fast as the flume or conveyor can take the logs. The Rake has a horizontal pulling action toward the machine which provides a precise control for spotting the 5 ft. x 3 ft. board. Operated on the principle of a parallelogram, the board maintains a semi-vertical position at all angles of the boom and stick. Complete visibility allows placing of the board exactly where it is needed, and it may be moved in any manner toward or away from the machine through a simultaneous drag and swing action. This enables the car to be quickly and completely cleaned with a minimum of manual clean-up. *Thew Shovel Co., Lorain, Ohio.*

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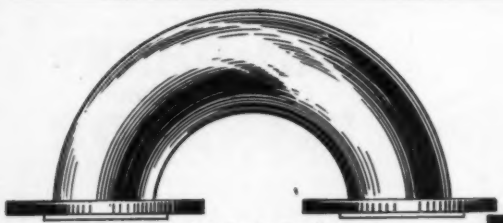

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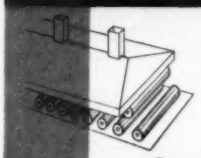

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ON CLAY LINES

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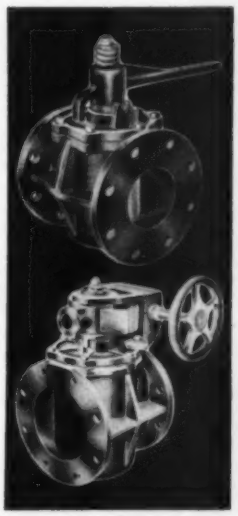

Valve leakage ENDS when you install DeZURIK Easy-Operating PLUG VALVES. Resilient-faced plugs close dead-tight, rubber to metal, without friction, sticking or gumming. These safer, surer valves are made in all sizes and metals, for manual or remote control.

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SARTELL MINNESOTA

New Products Briefs . . .

SMOKE INDICATOR—To assure plant engineers that their plant smoke conditions are within the legal limits established by municipal ordinances and to provide a simple and direct method of maintaining a continuous check on over-all combustion efficiency, the Fireye photoelectric smoke indicator, Series FE, continuously indicates the density of smoke passing through the stack of a power plant and signals when the smoke density exceeds a preset valve. *Combustion Control Corp, 720 Beacon St., Boston 15, Mass.*

ICE MELTING PELLETS—A new phosphate-type rust inhibitor has been added to "Ice Rem," ice and snow melting chemical pellets. Known as Speconite, the new inhibitor is said to safeguard against excessive rust in the deicing of metal pipes, drains, downspouts, railway switches, metal loading ramps and curbs. *Speco, Inc., 7308 Associate Ave., Cleveland 9, Ohio.*

RUBBER-BASE PAINT—Based on synthetic rubber resin, the new Cementkote rubber-base for outside use can be applied to cement, cinder block, stucco, brick and stone, providing resistance to moisture penetration and alkali reaction. The moisture-sealing action also reduces flaking and cracking of masonry caused by freezing and thawing. *Tropical Paint & Oil Co., Cleveland 2, Ohio.*

WATER REPELLENT—Hydrocide S. X. 2210, a new extension of Sonneborn's water repellent line, is an aqueous solution of silicone resin compounds specifically designed for all masonry surfaces with a high lime content, such as limestone and asbestos cement sidings. It is invisible, non-inflammable, and will not discolor or wear away. *L. Sonneborn Sons, Inc., Dept. P-4, Building Products Div., 80 Eighth Ave., New York 11, N. Y.*

VISCOSITY MEASUREMENT—Model MP Multi-Probe Ultra-Viscoson systems for continuous, automatic viscosity measurement to 650° F. and 1,000 psi pressure at up to 16 probe stations have recently been announced. Hermetically sealed ultrasonic probes the size of a fountain pen, having no moving parts, are installed permanently in up to 16 kettles or pipe lines. *Ultra-Viscoson Corp., 1240 Main St., Hartford 3, Conn.*

ELECTRIC FORK TRUCK—The Spacemaster 61-in. electric fork truck has an attachment capable of handling drums or pallet loads. The forks are grooved to fit the contour of the drums and hold them securely in place. Horizontal adjustment of the forks is from 12½ in. to 68½ in. It is possible to handle two drums at a time. All controls are hydraulically operated from the driver's cab. *Lewis-Shepard Products, Inc., Dept. R-1, Watertown, Mass.*

ADHESIVES—As a result of extensive development, a significant improvement in the storage life of the standard Synco adhesives has been effected. Storage life is said to be at least double that available heretofore. There is also a comparable increase in pot life of the adhesive after hardeners have been incorporated. *Technical Service & Development Dept., Snyder Chemical Corp., Bethel, Conn.*

FLOOR COMPOUND—A new cold adhesive compound for resetting, repairing and resealing wood block floors, known as "Blockset," is said to seal block floors tightly and form a smooth surface which withstands the heaviest traffic. It does not require heating. It is waterproof and dries quickly and when dusted over with silica sand, can be trucked over immediately after application. *Monroe Co., Inc., 10703 Quebec Ave., Cleveland 6, Ohio.*

GALVANIZING COMPOUND—"Galvanite" new cold galvanizing compound may be applied with any ordinary paint brush, electric spray gun, or by cold dip. This compound differs basically from other metallic paints containing zinc, in that it actually combines with the base metal, setting up electrical continuity. It leaves a coating of 96 parts, by weight, of chemically pure zinc. *Galvanite Corp., Chemical Div., 40 West 29th St., New York 1, N. Y.*

BELT DRESSING—Liquid belt dressing Grako Sprazon, a leather preservative containing no rosin or other injurious materials, is now being marketed in a 12 oz. spray container. It keeps belts pliable, resilient, and imparts a high coefficient of friction which prevents slipping. *Graton & Knight Co., 356 Franklin St., Worcester 4, Mass.*

The Paper Industry New Literature

Books

PHILLIPS' PAPER TRADE DIRECTORY OF THE WORLD. 1953 Edition. Published by S. C. Phillips & Co. Ltd., Graham House, 3 Tudor St., London E.C. 4, England. 5¼ x 8¼. 864 pages. £ 1. 19. 6, postpaid (approximately $5.57 U.S. coin).

As in previous years, this new edition has been completely revised and contains such information as world paper, board and pulp mill addresses, telephone numbers, nearest railway stations, sizes and number of machines, annual output, agents and sales offices. Also included are associations and federations, a glossary of trade terms in six languages and an illustrated list of Scandinavian pulp marks.

British mills are classified in counties alphabetically and numerically and British watermarks are listed. British agents and representatives, together with the mills they represent, are shown, as well as British wastepaper, rag and paperstock merchants, esparto importers and paper merchants.

The British paper and board converters' section contains lists of manufacturers of waxed, pitched, oiled, gummed, corrugated, crepe, lace, toilet, carbon, fancy papers, etc. Firms engaged in converting operations are included as follows: slitting, reeling, sheet cutting, paper yarn spinning, etc.

ENGINEERING MATERIALS MANUAL. Edited by T. C. Du Mond. Published by Reinhold Publishing Corp., 330 West 42nd St., New York 36, N.Y. 373 pages. 9 x 12. $5.50.

The best special sections that have appeared in the series of "Materials & Methods Manuals" published in *Materials & Methods* during the last few years are contained in this volume. Complete descriptive information and reference data are given on every engineering material of interest to industry, including metals and nonmetallic materials, as well as finishes and coatings to protect these materials.

The book is composed of 28 sections, each presenting the complete story on a single material or group of materials from a practical viewpoint.

MALEIC ANHYDRIDE DERIVATIVES. By Lawrence H. Flett and William Howlett Gardner. Published by John Wiley & Sons, Inc., 440 Fourth Ave., New York 16, N. Y. 269 pages. $6.50.

Most of the reactions of maleic anhydride described in the volume illustrate the chemistry of the double bond, basic to the synthesis of almost all industrial organic chemicals. Hydrocarbons, halogens and their compounds, hydrogen, metallic compounds, compounds containing nitrogens and oxygen, sulfur compounds, and energy and catalysts are covered in the chapters of this book.

A unique feature of the book is its format. Each preparation is conveniently arranged across two facing pages. The right-hand page includes the net equation and a description of the method; comments, a description of the reaction products, and possible uses are given on the left-hand page.

ESTIMATING STANDARDS FOR PRINTERS. By Fred W. Hoch. Published by Fred W. Hoch Associates, Inc., 461 Eighth Ave., New York 1, N.Y. 278 pages. 6 x 9¼. $5.00 plus 25 cents for handling and mailing.

This new book has been written for the purpose of bringing up to date all estimating information on methods, machines, and operations in the letterpress, platemaking and binding divisions of the graphic arts industry. It replaces the *Standard Book on Estimating for Printers,* now out of print. The second chapter of the book deals with paper stock.

91 PAPERMAKING FIBERS. By Charles H. Carpenter and Lawrence Leney. Published by State University of New York College of Forestry, Syracuse 10, N. Y. 152 pages. $2.00.

This new publication is a revision of Mr. Carpenter's "An Atlas of Paper-Making Fibres," published by the College in 1932. This edition contains 382 photomicrographs, compared to 229 in the 1932 edition. Many of the fibers in the first edition are shown in new photos, and 35 additional fibers are included. The book contains 86 fibers of plant origin, including 35 coniferous woods, 35 hardwoods, and 16 cell types of herbaceous plants of interest to the paper maker. Wool, silk, asbestos, rayon, and nylon fibers are also included.

Booklets and Pamphlets

PAPER TRADE TERMS. Third Edition. By William Bond Wheelwright. Published by The Callaway Associates, 172 Summer Street, Boston 10, Mass. 3½ x 5½. Leatheroid Binding. 75 cents. This new, enlarged edition defines 747 terms common to the paper business. Seven of its ten full-page illustrations are entirely new, showing photographs of modern papermaking machinery. While the definitions are restricted mainly to commercial paper terms, mechanical definitions have been introduced in such cases as may be helpful in clarifying certain of the common terms used in the sale and purchase of paper.

DIAMOND'S SODA BLEACH SOLUTIONS. Published by Diamond Alkali Co., 300 Union Commerce Building, Cleveland 14, Ohio. 44 pages. 8½ x 11. This handbook describes the general properties of hypochlorites, analyzes the five major factors governing effective control of solution stability, and outlines calculations of chlorine, caustic soda, and water involved in producing bleach solutions of any given concentration. In addition, 13 specific tables are given, including charts listing quantities of materials and ice required to make 1,000 gallons of stable soda bleach solution. Refrigeration requirements, analytical methods for effecting chemical control, and necessary solution preparation equipment are reviewed.

HIGHLIGHTS IN THE HISTORY OF FOREST CONSERVATION (Information Bulletin No. 83). Published by United States Department of Agriculture Forest Service. Order from Superintendent of Documents, Government Printing Office, Washington 25, D. C. 24 pages. 15 cents. The development of forest conservation in this country from the days when the first colonists landed on America's forested shores to the present is traced in this new booklet, which presents chronologically the more important state and federal laws dealing with forestry, action taken under those laws and the development of forestry organizations and the forestry profession from 1620 to 1951. Breaking the history down into five eras, the booklet briefly summarizes each.

Manufacturers' Publications

Through the co-operation of manufacturers and suppliers, THE PAPER INDUSTRY *lists the following catalogues, bulletins and booklets. They may be obtained without cost or obligation, unless otherwise specified, by writing direct to the manufacturers. Please address requests on your company letterhead.*

Water Consumption Calculator. Sandusky Foundry & Machine Co., Sandusky, Ohio—This new water consumption calculator slide chart has the primary function of rapidly and easily calculating the water consumption of Sandusky showers under all standard paper mill operating conditions. The chart also describes, by illustrative and written means, the working principles and features of Chief Sandusky shower pipes, in addition to technical data regarding pipe selection, specifications, installing, etc.

Reboiler and Condenser. Doyle & Roth Mfg. Co., Inc., 136-50 Twenty-Fourth St., Brooklyn 32, N.Y.—Specifications of the Doyle & Roth line of standard vertical thermosyphon reboilers and reflux condensers are given in a new 4-page bulletin.

Fork Lift Trucks. Hyster Co., 2902 N. E. Clackamas St., Portland 8, Ore.—Titled "How to Operate a Lift Truck," this 24-page booklet is a comprehensive manual for use in training lift truck operators. Combining a two-color cartoon technique with a detailed manual approach, the booklet contains information about operation of a lift truck, preventive maintenance, safety and basic materials handling. Drawings for setting up an obstacle

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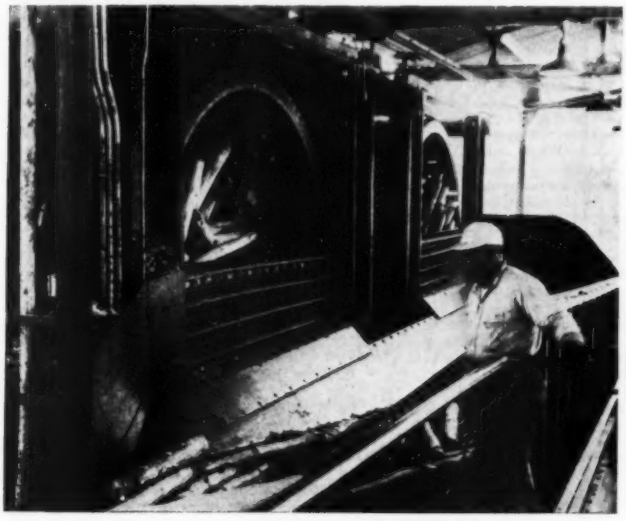

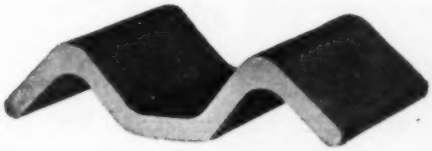

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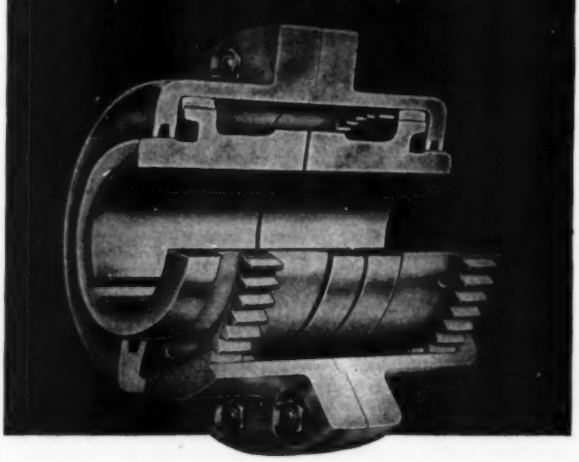

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course are also included. It is slanted for both the beginner and the experienced operator.

Materials Level Indicator. Convair Corp., Pittsburgh, Pa.—This 4-page leaflet describes the "Bin-Vue" materials level indicator, including dimensions, price list, advantages, and a partial list of users.

V-Link Belting. Brammer Corp., 684 Broadway, New York, N.Y.—A new data book (No. 205) on V-link belting includes sizes and prices; advantages of V-link belts in comparison with endless Vee belts; a comparison of Brammer V-link with other detachable V-link belting; selection table with power correction factors; assembly, installation and maintenance instructions.

Soot Blowers. Copes-Vulcan Div., Continental Foundry & Machine Co., Erie 4, Pa.—32-page Bulletin 1004 discusses fifteen central station installations of Vulcan Automatic-Sequential soot blower systems. Power and reheat boilers with capacities to 1,370,000 lb. per hour, pressures to 1925 psi and temperatures to 1055° F. are included. Blowing medium is steam or air, and units are power-driven by air or electric motor.

Friction Clutches. Link-Belt Co., 307 N. Michigan Ave., Chicago 1, Ill.—Beyl friction clutches and clutch couplings are described in a new 4-page folder, No. 2437. Included are schematic drawings and dimensional tables that enable the engineer to select the right clutch or clutch coupling for each requirement.

Formic Acid. Heyden Chemical Corp., 342 Madison Ave., New York, N.Y.—This new technical bulletin summarizes recent research on the uses of formic acid in many industries. The properties of this acid, methods of handling, and preferred equipment are described in detail. Some of the chemical reactions of formic acid are reviewed. A survey of the literature on formic acid includes sections on resins, solvents, floorings, fumigants, etc.

Control Centers. Westinghouse Electric Corp., Box 2099, Pittsburgh 30, Pa.—A new 31-page application booklet, B-5621, discusses the characteristics of control centers that make for flexibility of application, ease of servicing, and safety of operating personnel. Three types of control centers are described, and the various electrical components that make up typical units are illustrated and defined. A three-step building-block system of planning control centers is given, along with check charts to aid the selection of the right control center arrangement. Reference tables for proper selection of starter size are provided.

Electric Power Distribution. General Electric Co., Schenectady 5, N.Y.—"Industrial Power Distribution Idea Book" is the title of a new 28-page guide for plant engineers on electric power distribution practices in large and small plants. Designated as GEA-5900, this bulletin covers utility distribution practices, methods of buying electric power, what to do when a choice of primary voltages is available, application of primary switches and circuit breakers, types and arrangements of primary cables, and types of load-center distribution systems, in addition to many other topics.

Locomotive Cranes. Orton Crane & Shovel Co., 608 S. Dearborn St., Chicago, Ill.—This 16-page catalogue, No. 84, describes the advantages of the torque control unit used in Orton cranes (the General Motors Allison torque converter). A feature of the catalogue is a triple-page spread with a phantom view of the mechanism. A cutaway drawing of the converter units is also described. Complete clearance dimensions, weights of rehandling clamshell buckets and rated lifting capacities of standard gauge 8-wheel locomotive cranes are included in the catalogue. All models are described and rated.

Constant Temperature Baths. Fisher Scientific Co., 717 Forbes St., Pittsburgh 19, Pa.—A new 8-page booklet entitled "Constant Temperature Baths" permits the analyst, bacteriologist, oil chemist and control technician to combine a variety of jars, heaters, stirrers, thermostats and other components to produce the precise bath capacity and control required in the laboratory. These new "unitized" standard parts are all listed and illustrated.

Materials Handling. Yale & Towne Mfg. Co., 11000 Roosevelt Blvd., Philadelphia 15, Pa.—Bulletin P-1173-A, containing four pages, describes the Pak-Loader system for handling materials in unit loads without the use of pallets. Many photographs are included.

Dermatitis. West Disinfecting Co., 42-16 West St., Long Island City 1, N.Y.—This 32-page booklet, "The Control of Dermatitis in Industry," presents a prevention and control program for guaranteeing personal cleanliness, protecting exposed skin areas, preventing clothing contamination, and guarding against special hazards. The conditions which should be checked to determine the cause of a case of dermatitis when it occurs are listed. A six-page chart covering a wide range of industries lists various working conditions, types of dermatitis prevalent where these conditions exist, and suggested preventive measures for each. Brief descriptions of typical industrial skin troubles are included. Various West products are described in detail.

Building Maintenance. Stonhard Co., 600 Stonhard Co., 1306 Spring Garden St., Philadelphia 23, Pa.—A new 48-page manual entitled "Over the Rough Spots" presents information on how to patch holes or resurface any type floor, solve water seepage problems in underground foundations, repair leaky roofs, preserve concrete or wood surfaces, protect structural steel from rusting, and gives many other time and labor saving methods in solving building maintenance problems.

Graphitization. Edward Valves, Inc., Dept. GA, East Chicago, Ind.—This 12-page booklet comprehensively discusses the graphitization phenomena encountered in systems operated at elevated temperatures in the power and processing industries. Based on an intensive research program in the company's laboratories, this research study describes in detail the nature of graphitization and its effects and lists preventive and corrective measures. It contains photomicrographs of metallurgical specimens illustrating the graphitization process and eutectic diagrams and graphs illustrating the effect of temperatures, time, and other variables on graphitization.

Motors. General Electric Co., Apparatus Dept., Schenectady, N. Y.—This 16-page booklet, GEA-5567, describes the new improved GE fractional horsepower motors, including many colored photographs.

Current Controller. Minneapolis-Honeywell Regulator Co., Industrial Div., Wayne & Windrim Aves., Philadelphia 44, Pa.—Two-page Instrumentation Data Sheet No. 11,3-2A describes the pneumatic current controller. Equipment requirements and operation are discussed. Photographs of the equipment, plus a schematic diagram for the proportional controller of a two-zone electrically heated gas carburizing furnace, are included.

Worm-Gear Motors. U.S. Electrical Motors Inc., P.O. Box 2058, Los Angeles 54, Calif.—Bulletin No. 1650 illustrates Type GW low speed right-angle worm-gear motors in various modifications, accompanied by interesting cut-open views in quadra-color, with enlarged details of distinctive features and processes of manufacture.

Gate Valves. Edward Valves, Inc., East Chicago, Ind.—A new line of cast steel gate valves are described in a new 6-page catalogue, No. 12-E. The catalogue contains complete information on details of design, material specifications, pressure and temperature ratings, and dimensional details and weights. A special testing procedure which assures two tight fitting faces is also described.

Cleaning System. Lamson Corp., Billmyre Blower Div., Syracuse 1, N.Y.—The new 20-page booklet, No. D-5, gives complete information on the Exidust central vacuum cleaning system. Diagrams, as well as photographs, are used to describe this industrial and commercial cleaning system. Design features and details are clearly presented. Sufficient engineering data is included to make it possible for the reader to plan his central vacuum cleaning system in complete detail. Uses and names of representative users are given.

Speed Reducers. Western Gear Works, 417 Ninth Ave., South, Seattle, Wash.—Pacific-Western right-angle speed reducers, spiral bevel and helical gear types, are described in 35-page Bulletin No. 5203, which contains information to assist the customer in selecting the proper speed reducer for any job. A simple method for ordering reducers and for estimating requirements is also included. In addition, complete lubrication specifications for all reducers are listed.

Caustic Soda. Wyandotte Chemicals Corp., Michigan Alkali Div., Wyandotte, Mich.—This 56-page booklet contains data on grades of caustic, manufacturing processes, analytical methods, shipping, procedure for billing, freight rates, unloading and handling precautions, containers, materials of construction for storage tanks, pipe lines, pumps, etc., for the handling and storage of caustic soda.

Needle Valves. Lunkenheimer Co., Cincinnati 14, Ohio—Specifications and dimensions of new gland-type needle valves are graphically described in 4-page Circular 568. The circular shows in specific detail the wide selection of gland-type needle valves.

Pressure Gauges. Minneapolis-Honeywell Regulator Co., Industrial Div., Wayne & Windrim Aves., Philadelphia 44, Pa.—Four-page Specification Sheet 709 describes Brown indicating and recording pressure gauges with Electr-O-Vane control. Construction and engineering details are included.

Reciprocating Pumps. Warren Steam Pump Co., Inc.—Installation, operation and maintenance of Warren reciprocating pumps are covered in 20-page Bulletin 202. In addition to these subjects, there is general engineering information of special interest to operating engineers.

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Chemists, chem. engineers and laboratory men for mills, also for selling and demonstrating, salary range $3600 to $7500 a year; plant engineers and asst. plant engineers; mechanical engineers, designers and draftsmen; power plant supervisor; electrical engineer and ast. civil engineer; training supervisor; foreman finishing and shipping board mill, also finishing foreman sulphite bond; beater engineers; machine tenders and back tenders.

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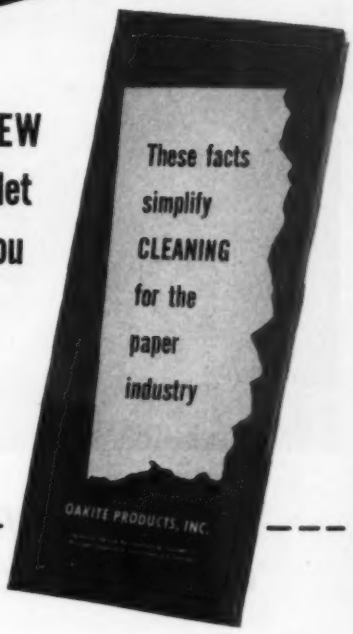

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- **cleaning Fourdrinier wires**
- **removing slime, pitch**
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Rainy River water has color ranging from 40 to 80 ppm, making it unusable for bleached pulp and paper. The Minnesota & Ontario Paper Company successfully reduces color to a range from 2 to 4 ppm through use of two horizontal Permutit® Precipitators and five gravity filters. The cost for chemicals averages less than 1.5¢ per 1,000 gallons. The purity, low color and lack of turbidity make the effluent water ideal for production of high brightness pulps and papers.

Here is yet another case where Permutit know-how and equipment have helped produce finer pulps and papers, regardless of the original state of the water supply. For full information, write to The Permutit Company, Dept. PI-3, 330 West 42nd St., N. Y. 36, N. Y. or to Permutit Company of Canada, Ltd., 6975 Jeanne Mance St., Montreal.

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- Higher production—lower production costs.
- More sales . . . bigger profits.

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MARKET QUOTATIONS

RAGS (Domestic)
NEW RAGS

The following are quotations to mills, f.o.b. New York:

No. 1 White Shirt Cuttings	14.50 to 15.00
New Unbleached Muslins	16.00 to 16.50
Fancy Shirt Cuttings	7.00 to 7.50
No. 1 Percales	7.00 to 7.50
No. 1 Washables	4.00 to 4.25
No. 1 Light Silesias	9.50 to 10.00
No. 1 Light Prints	8.00 to 8.50
Light Flannelettes	9.00 to 9.50
Cottonades	4.75 to 5.00
Blue Overalls	8.50 to 9.00
Blue Cheviots	8.50 to 9.00
Canton Flannels, Bleached	14.00 to 14.50
Canton Flannels, Unbleached	14.00 to 14.50
Osnaburg Cuttings	9.50 to 10.00
Underwear Cuttings, Bleached	17.50 to 18.00
Underwear Cuttings, Unbleached	17.50 to 18.00
Khaki Cuttings—	
Sun Tan	6.50 to 7.00
Mixed	4.00 to 4.25
Linen Cuttings—	
American	12.00 to 12.50
White	18.00 to 19.00
Grey	18.00 to 19.00

RAGS (Domestic)
OLD RAGS

Quotations to consuming mills, dollars per hundred pounds, f.o.b. New York, follow:

	per cwt.
Roofing—	
No. 1	1.25 to 1.35
No. 2	.95 to 1.05
No. 3 and 4	.80 to .90
Twos and Blues—	
Repacked	2.50 to 2.75
Thirds and Blues—	
Repacked	2.25 to 2.50
Miscellaneous	1.75 to 2.00
Whites, No. 1—	
Repacked	5.75 to 6.25
Miscellaneous	5.00 to 5.25
White, No. 2—	
Repacked	4.75 to 5.00
Miscellaneous	4.00 to 4.25

RAGS (Foreign)
ex dock New York City
NEW RAGS

	per cwt.
New Dark Cuttings	Nominal
New Mixed Cuttings	
New Light Silesias	
Light Flannelettes	
Unbleached Cuttings	
New White Cuttings	
New Light Oxfords	
New Light Prints	

RAGS (Foreign)
ex dock New York City
OLD RAGS

	per cwt.
No. 1 White Linens	Nominal
No. 2 White Linens	
No. 3 White Linens	
No. 4 White Linens	
No. 1 White Cottons	
No. 2 White Cottons	
No. 3 White Cottons	
No. 4 White Cottons	
Extra Light Prints	
Ord. Light Prints	
Med. Light Prints	
Dutch Blue Cottons	
French Blue Cottons	
French Blue Linens	
Checks and Blues	
Linsey Garments	
Dark Cottons	
Old Shopperies	

ROPE and BAGGING
f.o.b. and ex dock New York City

	per cwt.
Gunny No. 1—	
Foreign	5.25 to 5.50
Domestic	5.00 to 5.25
Wool Tares—	
Light	5.75 to 6.00
Heavy	6.00 to 6.25
No. 1 Scrap Bagging	4.50 to 4.75
Manila Rope—	
No. 1 large	6.75 to 7.00
No. 1 small	5.75 to 6.00
Sisal Rope—	
No. 1 large	6.00 to 6.25
No. 1 small	5.50 to 5.75
New Burlap Cuttings	6.50 to 7.00
Jute Threads—	
Foreign (Nom.)	6.75 to 7.25
Domestic	6.75 to 7.25
Strings—	
No. 1 sisal	5.50 to 5.75
No. 2 sisal	5.00 to 5.25
Soft jute	5.25 to 5.50
Mixed	3.25 to 3.50

WASTE PAPER

The following are quotations, dollars per ton, for No. 1 packing f.o.b. New York:

	per ton
Shavings—	
Hard White Env. Cuts	115.00 to 125.00
Hard White No. 1	80.00 to 85.00
Soft White, one-cut	75.00 to 80.00
Soft White, No. 1	65.00 to 70.00
Coated Soft	45.00 to 50.00
Fly Leaf No. 1	25.00 to 30.00
Fly Leaf, Woody No. 1	25.00 to 30.00
No. 2 Mixed Col. Woody	20.00 to 25.00
Flat Stock—	
No. 1 Heavy Books and Magazines, Repacked	20.00 to 22.00
Mixed Books	14.00 to 15.00
Ledger Stock—	
No. 1 White	55.00 to 60.00
No. 1 Mixed (Colored)	35.00 to 40.00
Manilas—	
New Env. Cuttings	60.00 to 65.00
New Env. Cuts, One-Cut	
Extra Manilas	22.50 to 25.00
Manila Tab Cards, Free of Ground Wood	65.00 to 70.00
Colored Tab Cards	45.00 to 50.00
Kraft—	
New Envelope Cuttings	65.00 to 70.00
Tripled Sorted No. 1 100%	45.00 to 50.00
No. 1 Old Assorted	30.00 to 35.00
News—	
White Blank	65.00 to 70.00
Overissue	24.00—
No. 1 Folded	18.00—
Old Corrugated Containers	20.00—
New Jute Corrugated Cuts	26.00—
Mill Wrappers	14.00—
Box Board Chips	11.00—
No. 1 Mixed Paper	10.00—

CHEMICALS
f.o.b. shipping point

Alum (Papermakers)—	
Lump, cwt.	4.55—
Ground, cwt.	4.30—
Powdered, cwt.	4.70—
Blanc Fixe—	
Pulp, bulk, ton	90.00—
Dry, barrels	95.00—
Bleaching Powder—	
Drums, cwt.	5.00 to 6.00
Casein (Domestic Standard)	
20-30 mesh (bags), lb.	
80-100 mesh (bags), lb.	28.00—
Argentine, lb.	16.50 to 17.00
China Clay—	
Domestic Filler	
Bulk (mine) ton	10.00 to 15.00
Domestic Coating	
Bulk (mine) ton	17.00 to 25.00
Imported (ship side)	
Bulk (lump) ton	22.00 to 30.00
Chlorine—	
Tanks cars (wks) cwt.	2.70—
Gelatine (silicin), lb.	1.25 to 1.35
Glyc. (C.P.) drums, lb.	44.00 to 44.50
Litharge, powd. bbl. lb.	.15¼ to .16¼

MARKET QUOTATIONS

	New York, per 100 lbs.	
Rosin (Gum)—		
E	8.70—	
F	8.70—	
G	8.70—	
WW	8.90—	
Rosin (Wood), carlots,		
F.O.B. South	4.35 to	4.50
Salt Cake—		
Dom. bulk (wks) ton	17.00 to	23.00
Imp. bulk on dock—		
(Atl. ports) ton (Nom.)	22.00—	
Soda Ash—		
Bulk (works) cwt.	1.20—	
Paper bags, cwt.	1.50—	
Soda (Caustic)—		
Solid drums, cwt.	3.35 to	3.40
Ground and flake, drums, cwt.	3.75 to	3.85
Sodium Silicate—		
60 deg. 55 gal. drums, (works) cwt.	1.60 to	1.70
40 deg. 35 gal. drums, (works), cwt.	1.30 to	1.40
Starch—		
Pearl, 140 lb. bags, cwt.	6.39—	
Pearl, barrels, cwt.	6.39—	
Paper (Sp.) bags, cwt.	6.39—	
Powdered, barrels, cwt.	6.60—	
Sulphur (Crude)		
(Mine) bulk, long ton	21.00 to	22.00
Talc—		
Dom. 100 lb. bags, (mine) ton	25.00 to	28.00
Canadian	35.00 to	45.00
Titanium Dioxide—		
Barium Pig, bbls., lb.	.21 to	.21½
Calcium Pig, bbls., lb.	.21 to	.21½
Zinc Sulphide, bbls., lb.	11.50 to	11.75

WOOD PULP

Quotations on domestic and Canadian wood pulp, dollars per short air dry ton, delivered consuming mills including basic freight allowances, follow:

Bleached Sulphite	140.00—
Bleached Sulphite, Canadian	145.00—
Unbleached Sulphite	125.00 to 132.50
Unbleached Sulphite, Canadian	130.00 to 135.00
Bleached Soda	140.00—
Bleached Soda, Canadian	140.00—
Kraft, Bleached	145.00—
Kraft, Bleach., Southern	142.00 to 150.00
Kraft, Bleach., Canadian	145.00 to 150.00
Kraft, Unbleached, Northern	132.50—
Kraft, Unbleached, Southern	100.00—
Kraft, Unbleached, Canadian	100.00 to 125.00
Kraft, Semi-Bleached, Southern	140.00—
Sulphite Screenings	72.50—
Sulphate Screenings	67.50—

Quotations on imported wood pulp, dollars per short ton, on dock American Atlantic ports with varying freight allowances, follow:

Bleached Sulphite, Swedish, $10 freight allowed	140.00—
Bleached Sulphite, Norwegian, freight allowed	140.00—
Bleached Sulphite, Finnish, freight allowed	140.00—
Unbleached Sulphite, Swedish	115.00—
Unbleached Sulphite, Finnish, freight allowed	120.00 to 125.00
Kraft, Unbleached, Swedish	100.00—
Kraft, Unbleached, Finnish, freight allowed	105.00 to 135.00
Kraft, Bleached, Swedish	142.50—
Kraft, Bleached, Norwegian	

PAPER

Boards—

Prices per ton, delivered, 10 tons or more:

Plain chip	75.00—
News vat lined chip	87.50—
Filled news	85.00—
Solid news	87.50—
White vat lined chip	120.00—
Chip tube and can stock	90.00—
Single manila lined chip	125.00—
Single jute lined chip	120.00—
White patent coated:	
.020	155.00—
.018	157.50—
.016	160.00—

Book Paper—

Coated two sides		
70 lb. No. 2 enamel, 25x38-500, trimmed 4 sides	4 cases	$17.25
	Carloads	$16.30
45 lb. enamel, 25x38-500, trimmed 4 sides	4 cases	$13.05
	Carloads	$12.10
Uncoated		
55 lb. No. 2 offset, 25x38-500, trimmed 4 sides	4 cases	$14.80
	Carloads	$13.85
50 lb. A Grade English Finish, 25x38-500, untrimmed	4 cases	$14.05
	Carloads	$13.10
20 lb. envelope, 17x22-500, untrimmed	Carloads	$12.40
16 lb. tablet, 17x22-500	Carloads	$11.35

Rag Content Bond—

Extra 100% rag	70.45—
100% rag	62.65—
75% rag	48.15—
50% rag	38.90—
25% rag	31.75—

Rag Content Ledger—

Extra 100% rag	72.65—
100% rag	63.90—
85% rag	52.50—
75% rag	49.40—
50% rag	40.20—
25% rag	33.00—

Sulphite Bond—

Air dry bond (Watermarked)	19.00—
No. 1 bond (M.F. watermarked)	15.00—
No. 2 bond (M.F. watermarked)	14.00—
Plain bond (M.F. unwatermarked)	14.00—

Sulphite Ledger—

No. 1, M.F. watermarked	20.50
No. 2, M.F. watermarked	19.50
Plain, M.F. unwatermarked	19.00

News—

	per ton
Rolls, Standard (Contract)	123.00 to 126.00
Rolls (Spot)	(Nominal)
Sheets	138.00—

Tissues (Carlots)—

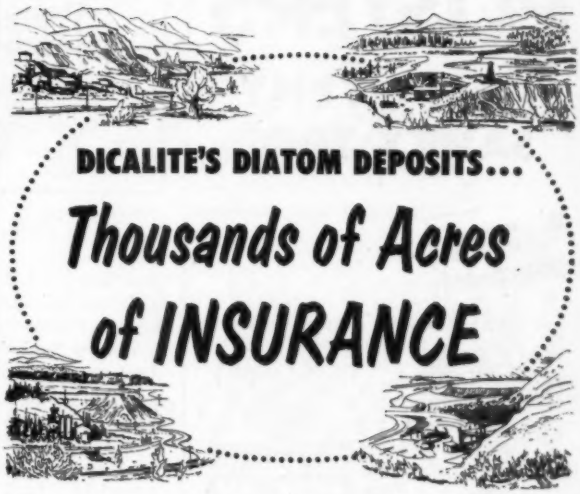
	per ream
White No. 1	1.85—
White No. 2	1.35—
Bleached Anti-Tarnish	2.20—
Colored	2.00—
Anti-Tarnish Kraft	1.75—
Manila	2.00—
Napkins, semi-crepe (12½ lb. to M shts.) per cs.	.90—
Napkins, full crepe and embossed (12½ lb. to M shts.) per cs.	.90—
Toilet, Bleached (M shts.) per cs.	10.00—
Toilet, Unbleached (M shts.) per cs.	8.00—

Towels

	per case
Bleached	6.30—
Unbleached	5.90—

Wrappings (Kraft)—

	per cwt.
Standard wrapping	7.75—
Butchers, counter rolls	8.25—
Standard bag, mill rolls	7.50—
Shipping sack, mill rolls	7.75—
Gumming, mill rolls	8.00—
Asphalting, mill rolls	7.75—
Envelope, mill rolls	9.25—



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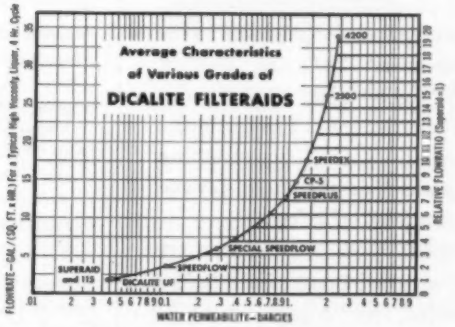

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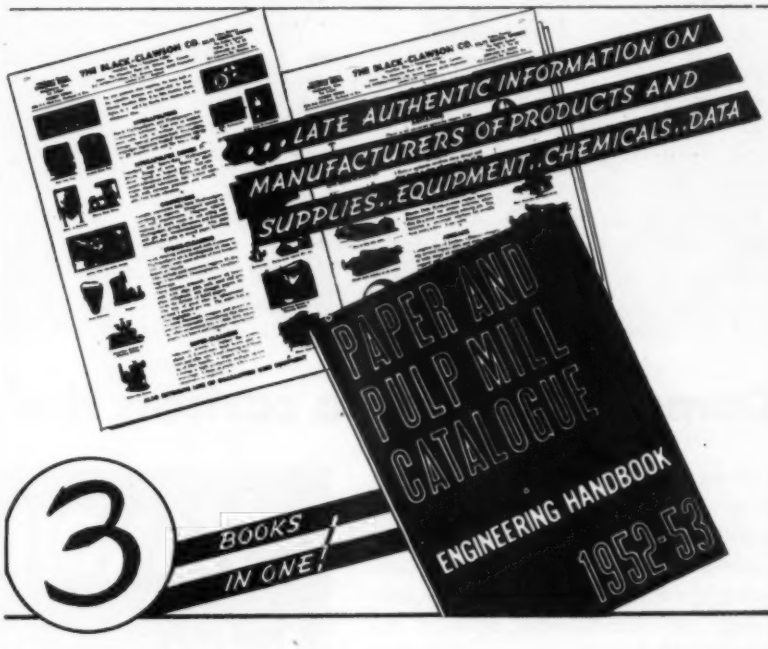
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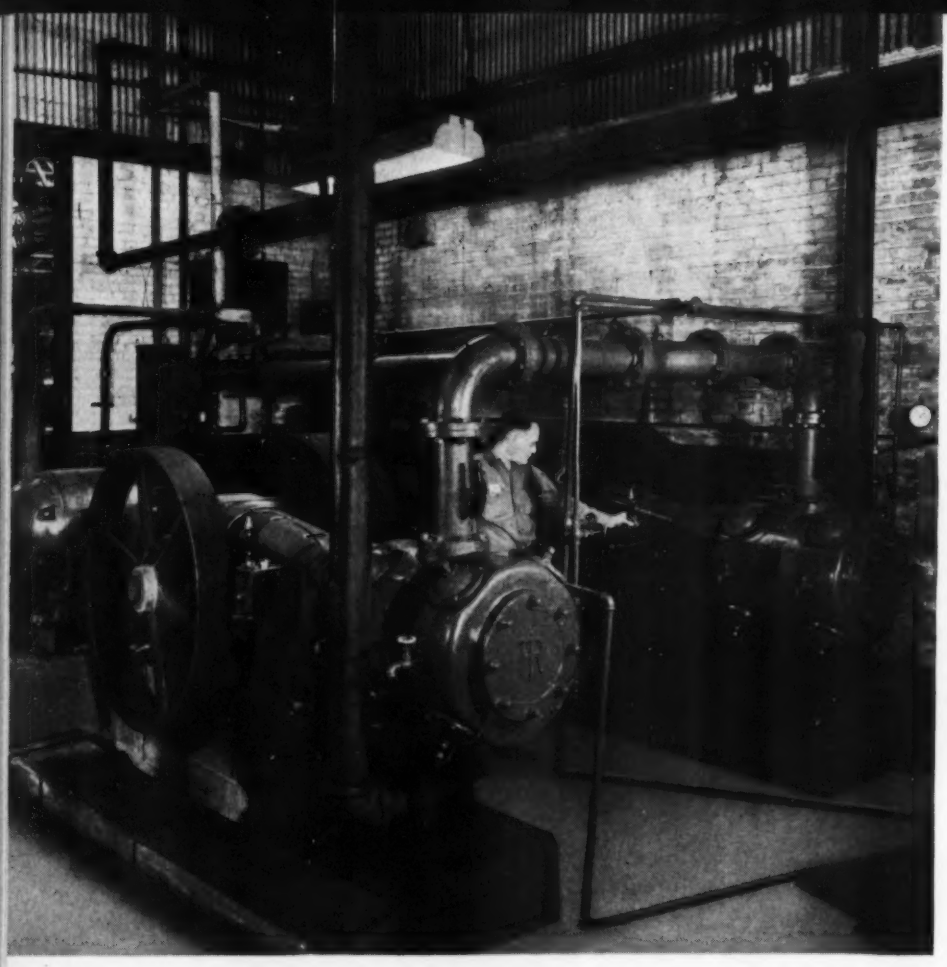

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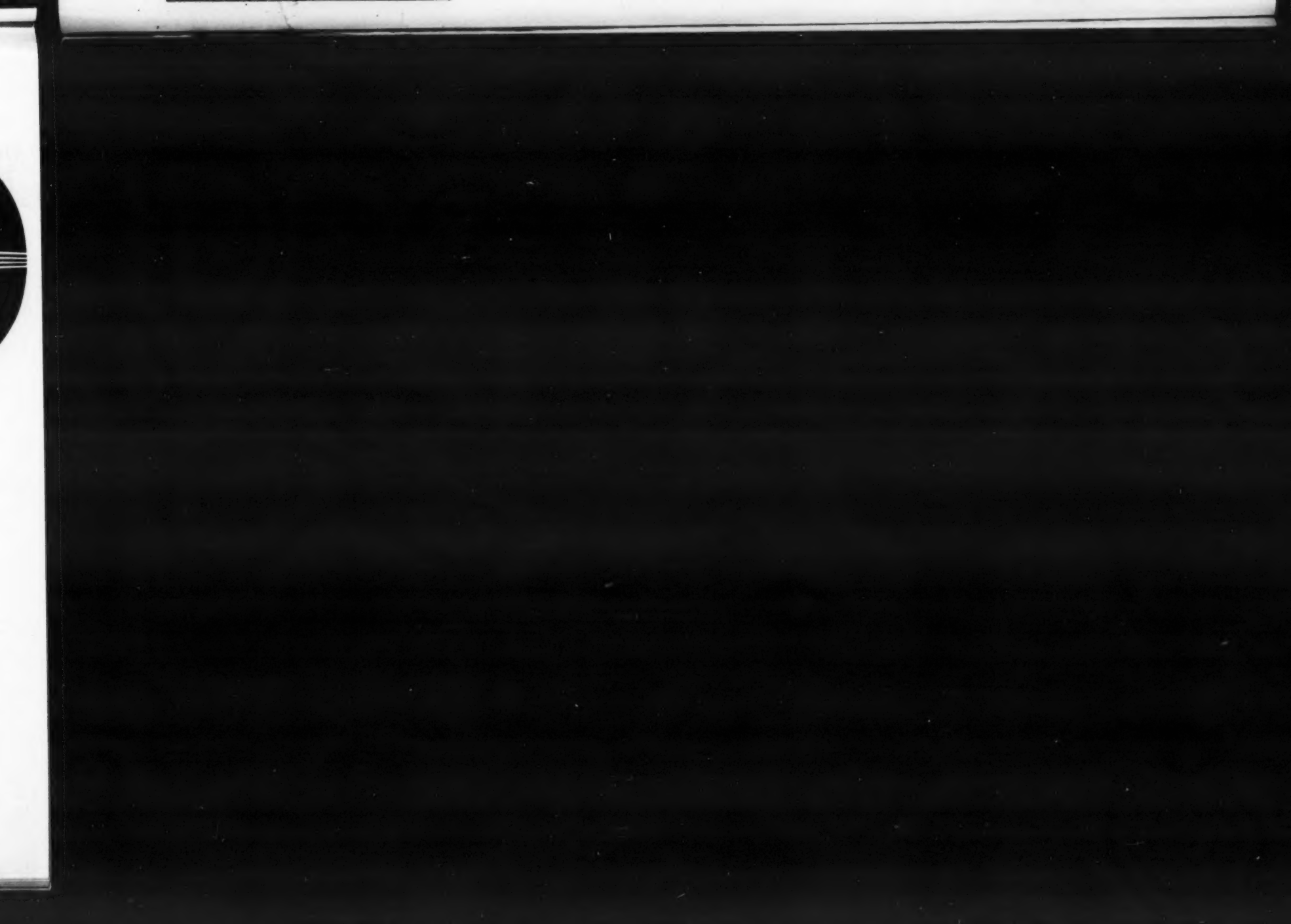

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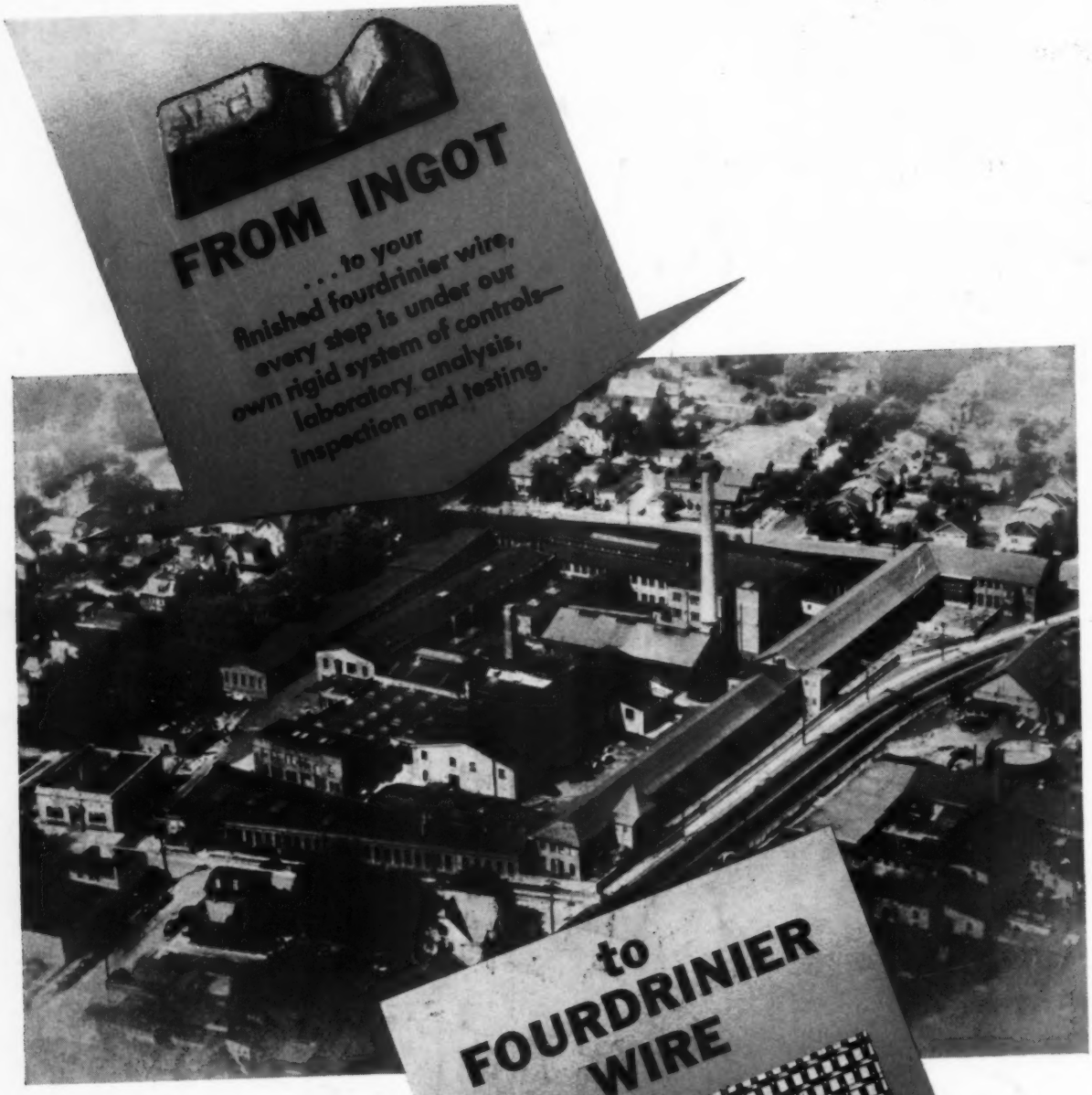
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